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Economic Competitiveness***

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SCIENCE & TECHNOLOGY POLICY

Germany: SPD's Jens on Calls for Research, Technology Policy

93WS0291A Duesseldorf *HANDELSBLATT* in German
23 Feb 93 p 5

[Article by Uwe Jens, Economic Speaker of German Social Democratic Bundestag Caucus: "Weakness of German Industry: Lack of Market Exploitation" First Paragraph is *HANDELSBLATT* introduction]

[Text] The Federal Association of German Industry (BDI) is urging the adoption of a "total concept" for promoting research and technology in Germany. The BDI points out that the elimination of special depreciation and investment tax incentives for research and development has made Germany virtually the only major industrialized country in the world that does not have tax incentives for research, development and innovation.

It is clear that the BDI is concerned not only with pure research, but is also calling for better funding for industrial research as well as for aid in developing research resources and converting research into marketable products (i.e., innovation).

These demands might also be termed industrial policy, not in the accepted sense of maintaining or adjusting industrial sectors, but in the sense of a future-oriented structural policy. After all, the de-industrialization of the new Federal Republic of Germany is reaching increasingly alarming proportions. The service sector is not creating nearly enough jobs to offset those lost in the secondary sector.

Without a manufacturing industry able to compete on the international market, it will be impossible to ensure prosperity in this country. In recent times, one thing has become increasingly clear: Judging from the number of patent applications, the problems faced by German industry are not due primarily to a lack of inventions, but to the inability of German industry to translate these inventions into marketable products.

The BDI cites microchip production as an example of this weakness. In the early eighties, Germany was still competitive in this field; now German microchip producers have fallen hopelessly behind. The invention leading to the telefax system originated in Germany; today fax machines are produced in Japan.

The list of examples of the failure of German firms to exploit inventions could go on. Consequently, we must not only increase our awareness of this problem, we must also use financial incentives to overcome the deep-rooted tendency to think only in terms of immediate profits.

For the present, the BDI's "total concept" is centered around aid for all stages of the innovation process, including the "process of translating an idea into a

marketable product." Exactly what this process entails, the BDI does not say. It makes sense, however, for small and mid-sized firms to receive more support for innovation than major corporations do.

The BDI states that "key technologies" which are particularly important to the national economy should be the primary focus of attention. Which technologies are "key technologies" remains unclear, however. During the early stages of industrial development, steel production was regarded as a key technology; now microelectronics is considered critical. But for how long? It seems unlikely that German industry will succeed in making up ground lost to Japan in this field.

It is important that the BDI is committing itself to the flexible use of both direct and indirect financing measures in order to best achieve its objective. In any case, experience has shown that indirect funding yields few visible results. Direct investment, on the other hand, is much more selective, although it does entail the risk of misinvestment. However, it is also more likely to be in a position to bring about a breakthrough in innovative policy.

For the most part, indirect funding measures are of no benefit to small and mid-sized businesses, which, contrary to the opinion of Schumpeter, can actually be more innovative than large corporations. It is good that the BDI has apparently become more willing to support direct funding for small and mid-sized firms.

In my opinion, there are three important prerequisites for an effective research and innovation policy:

1. Effective cooperation between research firms on the one hand and industry and science on the other.
2. Direct and indirect funding in order to stimulate innovation, with regard to both fixed capital and human resources.
3. Better and more rapid identification of promising technological fields.

It is often said that cooperation between firms conducting research is contrary to the spirit of the unfair trade practices act. This is not true. Transfer and technology centers were established throughout Germany to better disseminate scientific findings to German firms. The new German *laender* have considerable ground to make up in this area, however.

The elimination of special depreciation and investment tax incentives for research and development was a serious mistake, which must be remedied. Monetary support of human resources existed previously as well. Critics of the program for subsidizing labor costs often charge that it has a trickle-down effect. This is true of virtually any program, and this particular program has made important contributions to the maintenance of innovation and innovation personnel in small and mid-sized businesses.

It is critical that we improve our ability to identify promising technological fields, but this is not an easy task. Reports by structural experts have proved to be of no benefit where this is concerned, particularly inasmuch as the institutes content themselves with analyzing either the past or the current situation.

The customary requests by German industry or industrial associations for financial aid from the state have also proven to be rather absurd. In general, German industry has sounded the call for a "race to catch up with the foreign competition, with the help of state funds." This comes in the face of high economic risks that the companies themselves are unwilling to take (atomic energy) and an enormous amount of ground to make up where foreign innovations are concerned (airbuses and microelectronics).

The earlier approaches to the identification of promising technological fields make no economic sense. It is here that we must break new ground, without copying the Japanese Ministry of International Trade and Industry (MITI).

Science must play a greater role than ever in this task, both to curb the influence of special interest groups and ensure that the decisions that are made are more reasonable.

There is always the danger that research, technology, and innovation policy designed to encourage the conversion of ideas into products will lead to competitive imbalances. But if we want to avoid just going through the motions of competition and encourage stronger, more dynamic innovation, we must take this risk.

Naturally, there are other areas of policy which must be improved in order to foster more dynamic competition. Only if we have the courage to break free of all of our outmoded economic ideas do we have the chance to make up lost ground in the international market.

Siemens's Von Pierer on Trade, Joint Ventures in Southeast Asia

93WS0291B Duesseldorf HANDELSBLATT in German 23 Feb 93 p 15

[Article by Rainer Nahrendorf: "Von Pierer: The German Economy Is Not Suffering From A Japan Complex; Conversation With The Chairman Of The Board; We Had Lean Production Before The Term Existed"]

[Text] Southeast Asia is a key market for Siemens. Nonetheless, there is no single market strategy that can be applied to all Southeast Asian countries. This statement was made by Dr. Heinrich von Pierer, chairman of the board for Siemens AG, during an interview with HANDELSBLATT. Each Southeast Asian country has its own individual characteristics and presents its own opportunities and risks. The levels of development, structures, market volumes, and growth rates are all different.

It is true that Southeast Asia accounts for only approximately 7 percent of the world electrical technology and electronics market. (Germany accounts for 8 percent.) But the population of Southeast Asia (including China) is 20 times that of Germany. With an annual growth rate of 10 percent, Southeast Asia is the most dynamic electronics market in the world. Siemens currently obtains approximately 4 percent of its total business volume from Southeast Asia (excluding India and Japan) and Australia.

With a market share of something over 2 percent, Siemens is still underrepresented in this region as a whole. But all Siemens divisions have acknowledged the importance of Southeast Asia to their international sales. Siemens is represented in the region by sales offices and a total of 15 manufacturing plants. The majority of their business is conducted in the fields of communications technology, medical technology, transportation engineering, and in the utilities industry. In some Southeast Asian countries, Siemens's share of the communications and medical technology markets is already as high as 15 to 20 percent, depending on the individual market.

The Siemens traffic engineering division recently received an order from Singapore for the delivery of 19 railway trains valued at 250 million German marks [DM]. Siemens is competing with other German firms for contracts to build high-speed trains in Korea and Taiwan.

Only recently, the Siemens utilities division won a contract to build a diesel and gas turbine generating station on the Chinese island of Hainan. The contract is valued at approximately DM200 million. China is a good source of contracts for the construction of power plants, as it plans to increase its energy producing capacity by 10,000 megawatts annually. Approximately one third of this is to be in the form of hydroelectric power.

Von Pierer describes the rate at which China, Indonesia, and Thailand are constructing and expanding communications networks as fascinating. Its digital electronic switching system (EWSD) has enabled Siemens to win key contracts and establish a foothold in all of the important countries of Southeast Asia. Von Pierer states that numerous EWSD facilities have been built in China, and not only as joint ventures. As a result of licences and marketing contracts for HICOM [the ISDN in-house communications system of Siemens AG] systems, China has become the largest marketing area outside of Germany for Siemens's "Private Communications Networks" division. Since last year, the Siemens medical technology division has been involved in a joint project to manufacture tomographic equipment in Shanghai. The company recently entered into another joint venture in Shanghai for the manufacture of large telephone private branch exchange (PBX) systems.

German industry has often been accused of squandering opportunities for market growth in Asia. Von Pierer does

not believe that this can be said of Siemens. The company has been active in many Asian countries for decades, is engaged in many long-term commitments, and has representatives and branches in important Asian countries. Nonetheless, he is not entirely satisfied with what Siemens has achieved. Products tailored to the Asian market in terms of both price and technology should enable the company to further improve its market position.

Of course, it would seem natural that the physical proximity of the Southeast Asian market would prove particularly advantageous to Japanese industry. But von Pierer states that German corporations have been welcomed with open arms in all of these countries. Concerns within Southeast Asia about Japanese dominance translate into increased opportunity in these markets for German industry.

Furthermore, since the visit to India by Chancellor Kohl during the first leg of his trip to Southeast Asia, it has become clear that the trip will provide new stimulus and opportunity for German Industry in this region. Nonetheless, due to German cost structure, quality products labelled "made in Germany" are by no means cheap. German industry must make a concerted effort to retain price competitiveness. When competing for major projects, von Pierer has also often had the impression that rivals from other countries were able to obtain more favorable financing. This is not just a matter of soft loans, but also of commercial credit. Siemens actually lost the bid for a major project in Hong Kong due to unfavorable financing capabilities.

Von Pierer warns that German industry should not regard Asian countries merely as customer countries for its products and services.

It must also shift its creation of value to these countries. "Jobs are certainly not created simply by a more favorable cost mix in countries with a lower cost level. Long-term trade can only be established if a company is an acknowledged part of the local economy."

All joint ventures involve technology transfer. Consequently, German industry must expect massive competition from Southeast Asia in the long term, particularly from China. Nonetheless, Siemens is trusting that it will always have the strength and technology necessary to remain competitive. According to von Pierer: "There is no alternative either to joint ventures or to production within the foreign markets themselves." Within the framework of all of its activities in Asia, Siemens is presently studying the extent to which it will be able to establish increased developmental and manufacturing capabilities in Southeast Asia.

Over the last few years, Siemens has also established purchasing offices in Southeast Asia in order to exploit price advantages. These efforts will be increased.

Von Pierer does not believe that the entire German economy is suffering from a Japan complex. "Siemens is

certainly not suffering from such a complex. We regard the Japanese as competitors who must be taken very seriously, and from whom we can learn something, for example economical production methods. But Siemens had already adopted lean, but economical, production before the term "lean production" existed."

What is new, however, is that today a company must plan the entire value creation process, from the idea for the product to the subsequent maintenance and care of the plant. There is enormous room for improvement here, and it is essential that Siemens take advantage of it. Economic advisers could have made structural problems much more obvious.

Strategic alliances, such as Siemens has entered into, are always valuable when developmental costs are high, such as in the development of megabit chips.

Nowhere is it more apparent that long-term planning and ongoing commitment pay off than on the Indian subcontinent, where Siemens has been active for over 100 years and, with a business volume of DM750 million, is still a strong competitor. The Indian people know that the first telegraph line between London and Calcutta was built by Siemens between 1868 and 1870. The company did not wait until now, when there is talk of liberalization and new opportunities, to come to India.

On the subject of economic development in Germany, von Pierer said that he does not feel that the German economy is headed towards a deep recession. He does not subscribe to such pessimism, and thinks that German industry should avoid conjuring up something it would rather not see. A restraint in consumer patterns is already apparent. This is also the result of the general uncertainty.

According to Von Pierer, "We should be more optimistic about our economic development, and be thankful for the light at the end of the tunnel in the U.S. economy." It raises hopes that the Germany economy will also take a turn for the better—perhaps as early as the second half of this year.

As far as Siemens is concerned, its task is to become leaner and more aggressive. The productivity programs planned along a wide front must be carried out rapidly and the cost situation improved. In von Pierer's words: "In the long run, it is the firm that provides the best technology at the lowest price that will be successful."

JESSI 1993 Budget Drops ECU55 Million

*93BR0470 Paris ELECTRONIQUE INTERNATIONAL
HEBDO in French 1 Apr 93 p 16*

[Unattributed article: "Less Funding for JESSI Program"]

[Text] The 1993 budget for the European JESSI [Joint European Submicron Silicon Initiative] electronics research program will amount to ECU375 million (2.5

billion French francs [Fr]), compared with ECU430 million in 1992. It should be noted that 50 percent of JESSI is funded by the EC Commission and by the governments of the countries involved, while the remaining 50 percent is provided by the companies participating in the project.

France: ANVAR's 1992 Activities Summarized

93WS0311A Paris AFP SCIENCES in French
11 Feb 93 pp 3-5

[Unattributed article: "ANVAR [National Agency for the Implementation of Research] 1992 Priorities: Europe and Youth"]

[Text] Paris—With 1.54 billion French francs [Fr] earmarked to support innovation and 3,470 subsidies granted, in 1992 the National Agency for the Implementation of Research (ANVAR) privileged European partnerships, efforts in favor of youth, assistance to industrial conversion zones, and "innovation engineering."

"Last year, companies massively cut down on investment, but they maintained their research and development expenditures, which is something new," the ANVAR managing director, Mr. Henri Guillaume, emphasized at a press conference on 11 February; this year, Mr. Guillaume is also chairman of the EUREKA [European Research Coordinating Agency] high-level group.

3,470 Cases for a Total of Fr1.545 Billion

	Number	Amount (Million Francs)
Subsidies to Innovation Projects (API)	1,585	1,172.00
including hiring of researchers	414	75.70
and COFACE [French Foreign Trade Insurance-Credit Company]/ANVAR	71	6.30
Subsidies to Innovation Services (ASI), for companies	920	143.20
including subsidies to European technological partnerships	109	47.40
Technology transfer subsidies	203	120.50
SRC [contract research companies] subsidies	41	89.20
Efforts to increase youth's awareness of innovation	584	13.60
Independent inventors	135	6.50
including FNAFI [National Federation of the Association of French Inventors] subsidies		0.40
Total	3,470	1,545.00

1992 Subsidies to Innovation

Subsidies for the development of new products and processes still accounted for most of the ANVAR's activities in 1992 (1,587 cases representing a total of Fr1.172 billion, compared with 1,636 cases and Fr1.095 billion in 1991). The average subsidy was Fr1 million. Small and medium-size industries were the favored targets of these subsidies (67.5 percent), but the agency "intends to intensify its efforts in favor of 'medium-size to large' companies, which are likely to develop more ambitious projects," Mr. Guillaume pointed out.

"European technological partnerships took off, from 49 subsidies in 1991 to 109 in 1992, representing a total of Fr47.4 million," Mr. Guillaume indicated. An estimated 30 percent of these subsidies led directly to EUREKA projects. Last year, the ANVAR was also entrusted with the management of the European STRIDE [Science and Technology for Regional Innovation and Development in Europe] program, which is endowed with a Fr113-million budget and is designed to strengthen the technological environment in industrial conversion zones that experience difficulties. These credits are destined to 60 "employment basins" in 17 regions.

Last year, 584 youth subsidies were granted, amounting to Fr13.6 million. Lycee, high-school, and university students as well as student engineers were thus able to find industrial partners in their region. The Provence-Alpes-Cote d'Azur, Ile-de-France, and Languedoc-Roussillon regions alone received 48 percent of these subsidies; most projects had to do with electronics, instruments, agrifood, and the biomedical field. Over one-half have already produced material results: creation of companies, patents, training periods, and hiring.

As for technology transfer subsidies, their number increased (203, compared with 164 in 1991) as well as the amounts involved (Fr120.50, compared with Fr92.3 in 1991). The first independent French technology transfer company, FIST (French Scientific Innovation and Transfer) was created in 1992. Its shareholders include, in particular, the CNRS [National Center for Scientific Research], the ANVAR, the CEA [Atomic Energy Commission], and the INSERM [National Health and Medical Research Institute]. In addition, a technology dissemination network created in 1989 and covering 10 regions made it possible to exchange information and to finance over 1,000 technological "services."

Finally, the ANVAR's field experience enabled it to develop a specific trade, "innovation engineering," which, together with technology transfer, enables it to provide answers tailored to innovating companies.

Subsidies for Innovation Projects—Breakdown by Sector

	1990 (percent)	1991 (percent)	1992 (percent)
Primary Sector	0.8	0.9	1.4
Secondary Sector	75.3	74.2	68.6
Agrifood	4.7	4.3	3.3
Minerals and metals	1.6	0.5	1.5
Materials, glass	1.3	3.0	0.9
Chemicals, fibers	1.4	1.5	2.1
Parachemical, parapharmaceutical	2.9	3.7	5.9
Metalworking	5.0	7.6	7.2
Mechanical engineering	18.0	18.7	20.2
Electrical engineering, electronics	21.8	19.9	13.0
Automotive engineering	3.6	2.4	2.4
Shipbuilding, aircraft industry, armament	0.6	1.0	2.0
Textile, clothing	3.4	2.2	0.9
Leather, shoes	0.5	0.4	0.5
Wood, furniture	2.7	2.3	2.0
Paper, cardboard	1.3	0.7	0.6
Printing, publishing	0.8	1.7	0.9
Rubber, plastics	3.7	3.1	3.2
Construction, civil engineering	2.0	1.2	2.0
Tertiary sector	23.9	24.9	30.0

France: New Agency To Give Industries Rapid Prototyping Aid

93WS0314A Paris *PRODUCTIQUE/AFFAIRES*
in French 10 Feb 93 p 1

[Article: "ADEPA and Ecole Centrale To Launch 'CREATE' Jointly"]

[Text] Rapid prototyping technologies made their advent around 1985. They minimize the time needed to go from a CAD virtual mockup to a physical mockup (design mockup, feasibility mockup, model, or intermediate). Considering the economic stakes these technologies represent for industry, the Factory Automation Agency [ADEPA] and the Ecole Centrale de Paris have teamed up to launch a center for the transfer and testing of these technologies: the CREATE [European Rapid-Prototyping Assistance, Technology Transfer, and Experimentation Center]. The reasons at the origin of this project include the following: Rapid prototyping requires the use of new technologies whose methods of organization and use have yet to be instituted; their innovative character requires fast changes that potential users hesitate to introduce; and the Dassault Aviation and Citroen groups, after three years of joint use and validation of stereolithography, desire to share their know-how. A complete and integrated rapid-prototyping

cycle will be operational at this center. It will encompass three main facets: three-dimensional laser-digitization; CAD/CAM modeling and postprocessing; and production of mockups. Planned investments total 8 million French francs [Fr]. Three types of action are planned for the center: feasibility studies and experimentation centered on the production of industrial enterprises, with a view to enabling all types of industrial enterprises to evaluate the available methods; training and two- to five-day seminars with numerous tests; and watchfulness and innovation. Alain Bernard, lecturer (Factory Automation-Logistics, Ecole Centrale de Paris), heads the implementation of the project. Charles Mony, head of the CAD/CAM project at ADEPA, is responsible for tracking the project, for which three phases have been defined: lift-off of the project until May 1993; powered ascent (canvassing and dissemination of information among industrial firms) until May 1994; and full-fledged operation from May 1994 on.

ADEPA (Charles Mony) - 13-17 rue Perier, 92120 Montrouge. Tel: (1)46.57.12.70. Ecole Centrale (Alain Bernard) - Grande Voie des Vignes, 92295 Chateaufort-Malabry. Tel. (1)46.83.64.64.

FRG: Research Minister Wissman Sets New Accents

Cooperation Between Science, Industry

93WS0350A Duesseldorf *HANDELSBLATT* in German
17 Mar 93 p 15

["Close Cooperation between Science and Industry"]

[Text] *HANDELSBLATT*, 16 Mar 1993 hjs Bonn—The new German Minister of Research Matthias Wissmann (CDU) wants to shift the emphases in his ministry and to have the work performed under his responsibility to be understood more as oriented to the future. In his first press conference on 16 March in Bonn, he announced that he intends to encourage closer cooperation between science and industry and to pursue this dialogue with the participation of the labor unions.

Wissmann intends to respond to the Japanese challenge with a new "innovative strategy for the future." Approaches for the future-oriented innovative strategies include the following: 1) increasing technological competitiveness; 2) formulating future-oriented policies in the ecological, health, energy, and transportation fields; and 3) modernizing the structure of research.

In addition to strategy talks held with representatives from science and industry, specialized conferences on select topics will be convened. More assessments of potential are to be undertaken as, for example, in the field of information technology.

Wissmann hopes—with his newly accented research and technology policy—to make a contribution to ensuring

Germany's continued standing as an industrial state. He is looking at at least five starting points to initiate his program:

- 1) reexamination of the basic operating conditions set by the government;
- 2) strengthening the research and technology capabilities in the new German states;
- 3) accelerating the time required to convert the results of basic research into marketable products;
- 4) even stronger support for the research requirements of small and medium-size companies; and
- 5) increased reorientation of national research efforts to common European interests.

In order to strengthen the new eastern German states, the Ministry of Research is to help in establishing a research-favorable infrastructure, improve technological competitiveness, support the establishment of technology-related basic livelihood industries, and assist the innovative small and medium-size companies. It remains to be determined whether or not the existing apparatus for supporting future projects is capable of expansion. To invigorate the fossilized structure in the universities, a promotion initiative, called "innovation lectures," will be introduced in the universities.

Wissmann intends, within the framework of professional programs, R&D credits for so-called "jump starts," and incentives for cooperation in research, to support the small and medium-size companies throughout all of Germany much more than his predecessor. Wissmann is fighting to obtain tax relief in the form of special tax write-offs for R&D instead of write-offs for building depreciation, for example. The minister prefers the formula, "research instead of cement." Regulations of this sort, in conjunction with a business tax reform, have been able to be introduced.

Because of the strained budgetary situation, Wissmann has decided that there will be no new major projects sponsored in basic research and that a ceiling will be put on the activities of the major research establishments. Germany will undertake no new major space projects of its own and will put limitations on cooperative international contributions.

Italian Minister Interviewed in EC Research Policy

93MI0375 Turin MEDIA DUEMILA in Italian
Feb 93 pp 20-24

[Interview with Antonio Ruberti, Italian EC Commissioner, by MEDIA DUEMILA: "Ruberti: My Program for Community Research;" first three paragraphs are MEDIA DUEMILA introduction]

[Text] European research will remain in the hands of the European Community's new Italian commission until

the end of 1994. At the beginning of January, Antonio Ruberti took over from Filippo Maria Pandolfi as head of a sector that will be of crucial importance to European competitiveness in the coming century. Unlike Pandolfi, Ruberti will "hand over" responsibility for two areas—information technology and telecommunications—to Martin Bangemann, head of industrial policy, but will acquire two others, training and universities, giving him complete control over the European process of acquisition of a capital fund of know-how and knowledge.

Ruberti will also be able to work "in synergy" with another Italian commissioner, Ambassador Raniero Vanni d'Archirafi, who has been given the responsibility of overseeing management of the Single Market, as well as financial services and small and medium-sized industries, an area which has always been at the forefront in industrial innovation in Italy.

As the new commission gets under way, MEDIA DUEMILA interviewed Ruberti and Vanni d'Archirafi about their programs and priorities for the next two years and asked Pandolfi to sum up his four years of activity in the EC.

MEDIA DUEMILA: How would you judge the state of EC research policy, to which you have contributed in your role as minister [for scientific research] in terms of content, procedures, and funding? Which will be the priority measures and in which sectors?

Ruberti: When we talk about a common research policy, I have the impression that we are referring mainly to those programs managed directly by the EC and which, in previous years, have been the fulcrum of joint activity: the framework program, the activities of the Joint Research Center in sectors that are also important in terms of competitiveness.

Personally, however, I am convinced that when we speak of a common research policy, we should also be looking at ways in which the EC can promote cooperation and harmony between the policies of the various members. The Treaty of Rome contains the provision, later reinforced by the Maastricht Treaty, that the EC also has a role to play in creating harmony between national research policies.

Alongside those of the EC, there are other joint research programs in Europe such as EUREKA [European Research Coordination Agency], the ESA [European Space Agency], and others, some of which are extremely large-scale. The ESA, for example, has a budget that is twice that of the EC framework program. If we are unable to coordinate these activities, there is clearly a risk that any evaluation of the overall situation will be distorted.

In my opinion then, our first priority and the most pressing need we have to deal with is the complete coordination and harmonization of the research policies of the various member states and of the various European programs. In fact, this point was stressed in no

uncertain terms by the leaders of the Twelve at the Edinburgh summit in December. I intend to develop discussions and initiatives further in this direction.

The second priority I have set myself is to make use of the EC's powers for direct action, in the widest terms and in a coherent manner, both in the framework program and through the Joint Research Center. On the one hand by continuing to give support to direct research while, on the other hand, by also using the EC's resources to encourage cooperation and give support to projects involving various national research organs and even various areas.

MEDIA DUEMILA: The maxim that it is more important to spend wisely than to spend a great deal applies to research policies as much as to any other policy. But is Europe able to do any better with what it allocates, or does it need to allocate more? Or could overall savings be made by increasing contributions to the common fund?

Ruberti: As far as the evaluation of funding is concerned, we must be aware of a basic concept: 1 trillion lire will not resolve any problem on a European level if London, Paris, and Bonn then each go their own way. Money may well be the yeast of research but it can never be the substance.

I do not believe that European research policy should be a substitute for national policies, but rather the sum of many policies which must produce a sum of results. The EC's resources should be aimed at achieving no longer one, but two objectives:

- a) that of supporting direct programs in which the principle of subsidization applies, such as problems that are clearly of a transnational dimension—environmental protection, for example, or where an activity has objectives that go beyond the potential of a single country such as genome studies, or where there is an overall problem of industrial competitiveness such as biotechnology.
- b) that of intervening in a different way, in cases where the principle of subsidization (Editor's note—doing together only that which cannot be equally well done alone) comes into play. In this way we can reach the objective, which is also fundamental to the process of integration, of encouraging the policy of cooperation even through financial support.

In this context, quality is of prime importance. Here, another of the EC's principles comes into play along with subsidization, that of cohesion. It is also clear that in the field of research the basic idea is to pursue cohesion and so eliminate imbalances. However, the "hunt" for cohesion, for which ad hoc instruments already exist—that is the structural basis—must also take quality into consideration. It is essential for quality to increase in a balanced way: A very interesting program on mobility has been launched recently which, by facilitating the

mobility of young and European researchers, is directly aimed at achieving this cohesion. I think that this is the road to follow.

The improvement of quality is in any case fundamental, and should therefore also be pursued through the concentration of programs: if mobility promotes cohesion, the available resources could be better utilized to this end by concentrating them on bigger projects. It is not so much a matter of making savings, because the allocations are necessary, but of avoiding the appearance that funds end up seemingly exhausted by EC commitments: they must also fuel national investments.

MEDIA DUEMILA: What relationship do you see between research and production? And where would you draw—assuming you wish to draw—the line between using public funds to encourage research and safeguarding competitiveness?

Ruberti: This is a delicate question that has always been the cause of tensions. Historically, the commitment to research is linked to the competitiveness of the productive system and has tended therefore to concentrate more on innovation and developments, even though it has always been said that research was pre-competitive. In reality, under the new treaty, the mission given to EC research today is more general in character and is not limited to the field of pre-competition. Europe, in all its complexity is faced with a problem which concerns all its strong areas and industrial regions: When and how much to invest in pure and free basic research.

It is a question that has been the subject of many books and debates. I believe it is, as usual, a question of balance because there is no doubt that it is impossible to draw a definite line between basic and applied research.

Experience tells us that research serves to create new knowledge and so build up a reserve from which it will be possible to extract the patterns for new processes, innovations, and new products in the future.

The important thing therefore is the time frame. We should be well aware of what has already happened in Japan. There, the tendency to concentrate on applied research only has been under review during the past few years since it has become clear that the process of innovation cannot be maintained in the long term if a fertile humus for the production of new knowledge is missing.

However there is also the problem of sustaining the process of innovation, and with competitiveness in a critical phase we have to pay particular attention to this. In reality, the decision by the new commission to incorporate information technology and telecommunications policies with industrial policy bears witness to a willingness to support industrial policy with instruments of horizontal infrastructural growth, such as communications.

This problem is also present in those areas which are closely connected to research, such as biotechnology with its importance for nutrition and health, or advanced

materials, or automations. In these sectors today, it is extremely important to keep a close watch on what is needed to remain competitive. There are fields such as biotechnology where the result of research is the product itself.

A theory has been advanced that the leadership changes within the new commission will lead to a less rigid handling of its policy on competitiveness. It must not be forgotten, however, that EC policy has a continuity of its own. There will perhaps be a more flexible approach, but the basic principles will not change very much because there is also a strong sense of collaboration. It is clear that the difficulties relating to assistance in those areas closely connected with production could be simplified, but we will have to be careful.

We always speak of industrial research, but research is also of great importance in the secondary products as well as in services where innovation is galloping ahead, and in primary products. Consider, for example, the policy on agriculture and its difficulties: this year an agro-industrial program was initiated, a new and significant event. The EC commits more than half of its budget to the agricultural sector and yet the commitment to consistent research in this field has only just begun.

The question of public support for industrial research is substantially tied to a definition of the level of risk that a company can assume, and so to an estimate of the duration of any possible spin-offs. This is tied to the EC's entire industrial structure and therefore to the size of the companies and their market and also to the process of European industrial integration. In fact, the possibility of assuming "at risk" research is limited where companies are of a modest size; and at the same time investment in research by the big multinationals is in proportion to their size and their market.

It is difficult to ask small and medium-sized industries to take the risk and invest in research. It is here that I see the dividing line between private demand and the public sector, which must intervene each time the risk is too high to be assumed by a company. It is an argument that belongs to industrial policy and that can vary in time according to changes in the condition and the dimensions of European companies. For the moment, in Europe, and particularly in Italy, the small and medium-sized industry is very important.

MEDIA DUEMILA: Do you believe that the Maastricht Treaty will come into force and that European political and monetary union will become a reality? Or has this project for integration become diluted and has it started to sink into the new "grand Europe" in a phase of disintegration in the East after the fall of the Wall?

Ruberti: I think that the Maastricht Treaty has to be ratified and I do not believe that there will be any difficulty bringing it into force. Naturally, the coming into force of the Treaty is not everything: It then has to be put into effect and the dynamics of the process followed through.

With the achievement of a single internal market and the ratification of the Maastricht Treaty we conclude a stage which had the integration of the market as its main objective. Now begins another more complex stage that has [political and monetary] union as its objective, the most important aspects of which will include the centralization of foreign, defense, and judicial policy.

Personally, I believe that we must move in this direction because overcoming the fragmentation of the market and the creation of a single space for goods, capital, and services is of great importance and in some way instrumental in dealing with the more general question of Europe's role. If Europe does not regain a political role with its policies on defense and foreign affairs, the process of EC integration will be short-lived. And we are well aware of the difficulties that currently exist in this respect.

The processes of change that are taking place, including that of increasing the size of the EC, have to take an extremely complex situation into account. A few years ago nobody could have foreseen what has happened in the East: We are going through a phase of transformation in which it is difficult to make forecasts. However, I believe that there is a growing consciousness of the need for Europe to play a role in the politics of defense, which has been further increased by the difficulties created, for example, by the crisis in Yugoslavia.

MEDIA DUEMILA: Are you concerned about the impact of the principle of subsidization in those sectors for which you are responsible, and what do you feel about the more complex decision-making procedures for research, as provided for in the Maastricht Treaty?

Ruberti: As for procedure, which is certainly a delicate point, the complexity of the European institutional system involving three main players, the Commission, the Council of Ministers, and Parliament, means that finding a point of convergence is not always easy because of their differing areas of jurisdiction. Even in the individual states, convergency between two players, between government and parliament, is often complicated so finding a point of convergence between three parties is obviously even more difficult. This problem is peculiar to the nature of the EC, which must find a point of convergence between the expectations of the 12 countries, the need for integration and joint action, and parliamentary and national sensitivities. Structurally, that is how it is.

The Maastricht Treaty, which has introduced a procedure of co-decision for research programs in an attempt to bring together the positions of the Council and Parliament, and the Commission's proposals, would potentially appear to worsen the situation. On the other hand, still potentially, it could bring about a greater awareness of the complexity of the situation and thus lead eventually to clarity. In the past, the delays and difficulties that occurred were caused by the Parliament's desire to count in the decision-making. Now the Parliament knows it does count, and the other institutions can take this into

account and organize themselves accordingly. Perhaps I am being optimistic, but it seems to me that the new procedures stress the absolute need for a process of convergence from the very beginning. Those who are sure of their own powers do not take advantage of their position to gain even more, or resort to obstructive techniques to give weight to their opinions. This contributes toward creating an atmosphere conducive to consensus. Something similar occurred with the EC budget, on which it was far more difficult to reach an agreement when the Prallement's powers in that area were less clearly defined.

MEDIA DUEMILA: What slant do you propose giving to training and universities and how do you propose revitalizing a sector that has been neglected until now?

Ruberti: I consider the citizen's Europe, which is a market of professions and which is already in some way part of the Single Market, to be very important. We must work on this point. Making free circulation of the workforce possible brings with it real problems, but it is surely an enrichment. The philosophy that has been adopted respects the autonomy of the education process in the individual countries and has liberalized their end-products, in other words the qualifications.

However, this poses the problem of guaranteeing the quality and the standard of these products. At present, the duration of such studies has been defined and it is presumed that competition in itself will encourage a harmonization of the processes and thus of their quality. However, there is still the question of standards which weighs heavily on certain sectors of the market.

The quality of life, and the quality of products and their functionality also depend on the quality of education and training. This is the reason why an entire article on education and training has been included in the Maastricht Treaty. It was such an important and pressing subject that even if it had not been included in the Treaty, a task force had already been formed to deal with it and had already initiated a variety of programs such as ERASMUS [European Community Action Scheme for the Mobility of University Students], COMETT [Community Program for Education and Teaching in the Field of Technology], YES, and LINGUA (program for the improvement of language knowledge in the European Community) etc.

Today, however, a new chapter is opening and it remains to be seen how the Maastricht Treaty will deal with this subject. What does the introduction of the new article mean? As far as I am concerned, linking training and school and university education to research has a certain cultural and political value because it means that there is an awareness in Europe that all those areas where the capital fund of knowledge and know-how is produced, should be kept together. In this way we are moving from instruction as a social factor to instruction as a factor in the competitiveness of a system, which comes not only

from the knowledge resulting from research, but also from the know-how resulting from training.

Research and education must go hand in hand to produce this capital. The quality of training can grow alongside the system that produces knowledge. This is a line of thought that I followed in Italy, a line of unity in this complex modern society which has to deal with innovating the system of a capital fund of knowledge.

It is true that the United States jealously guards the autonomy of its professional training and scholastic institutes, and universities, because that is where its national identity lies. There is no doubt however that today the competitiveness of a system depends on the quality of its know-how. Know-how is wealth and human resources are wealth, so why should we speak of joint action for research but not for training and education.

MEDIA DUEMILA: In your opinion, does Italy still have a place in the union of Europe, and from the point of view of your own sector, in European research? And how can it reinforce or regain its place in this Europe?

Ruberti: When we speak about overcoming the fragmentation that has characterized the history of Europe, we tend to see all the positive aspects of integration that will make it easier for us to be competitive with the United States and Japan. This has been one of the mainsprings on which most emphasis has been placed. However, I am among those who are also convinced of the value of diversity. One of the most important elements in Europe's favor, as opposed to the United States for Japan, is not only its accumulation of cultural and political history, with all its successes and failures, but its very diversity, because diversity makes it much easier to adapt to a changing future. A more homogenous system is less adaptable to changes in society.

We Italians go into Europe with our diversity and also with our problems. As a nation we are currently going through a very difficult phase from a financial, economic, and social point of view, not least because of the emergence of old vices, and their diffusion and penetration of our society. And yet, even if in this difficult moment we tend to place the emphasis on the negative aspects and fail to recognize the vitality of certain sectors and certain parts of Italy, I continue to speak and think optimistically about the future. This is not only because the will to be optimistic is almost an obligation for anyone holding public office, but because historically Italy has always been able to meet its challenges and win through in the end.

I will give you an example. After the war, we had been used to a culture of self-sufficiency but we made our choices and found enough thrust to make a place for ourselves in the market. It could have seemed like a very dangerous move for us, but the country grew and the challenges stimulated its growth. Today we have a new challenge, that of convergence with our European partners. Attention seems to be focused mostly on the

convergence of financial and economic indicators but we should be careful because, while this is a problem, it is not the only one.

It is quite possible to have these indicators in order and still be a "B league" country because of the quality of our manufacturing system and of our services. We must make an effort then, because we are lagging behind in some areas. The sector in which we lag the furthest behind is that of services to the public, where inadequacies weigh most heavily on the citizens: schools, health, transport, and urban services, where the citizen is directly affected by, and helpless before, the lack of service. Certainly, these things go hand in hand, but there is too much emphasis on the indexes when in fact the industrial and manufacturing systems are less backward than that of services to the public.

Italy's Pandolfi Comments on Maastricht, EC Research Activity

*93MI0376 Turin MEDIA DUEMILA in Italian
Feb 93 pp 25, 28-29*

[Interview with Filippo Maria Pandolfi, former vice president of the EC Commission by Giampiero Gramaglia of MEDIA DUEMILA; time and place not given: "Pandolfi: Here is the Summary of My Four Years in Brussels;" first paragraph is MEDIA DUEMILA introduction]

[Text] Filippo Maria Pandolfi, vice president of the EC Commission headed the three sectors of research, information technology, and telecommunications from 1989 to 1992. In this interview the former commissioner discusses the results of his work, making particular reference to two important topics: high definition television and the Maastricht Treaty.

MEDIA DUEMILA: What, in your opinion, were the most important results obtained under your leadership in the research, information technology, and telecommunications sectors, and what have been your greatest disappointments?

Pandolfi: If I were to try to sum up my four years in Brussels subjectively, I would have to highlight two of the positive results achieved in the field of research, one that is clearly evident, and one that is a little less obvious.

The first is having succeeded in bringing research and technological development closer to the primary objective which is clearly spelled out in the Treaty: strengthening the scientific and technological foundation of European industry and supporting its international competitiveness. In other words, research as an instrument of modern industrial policy. The battle has not been easy and I cannot even say it has been completely won. However, "generic technology" and "priority technological projects" known as PTP are concepts that have gained acceptance at EC level. I could also mention that during the past four years, I have managed to increase

annual funding for research from ECU1 to 2.5 billion, ECU2.556 billion in the 1993 budget to be exact, more or less equivalent to 4.5 trillion lire. The real problem, however, is not how much to spend, but how to spend.

Then there is the second, less obvious result, which is having brought order to the legislative, administrative, and procedural instruments. In less than a decade EC research has developed from the pioneer stage to a stage of growth, to maturity. In this last stage, clearly defined regulations, simplified procedures, and above all transparency are essential.

MEDIA DUEMILA: And the disappointments?

Pandolfi: I have had plenty. Maybe not enough to balance the account but enough to make it more realistic. My greatest disappointment goes by the name of Maastricht. The new treaty has changed the rules for legislative approval of research programs for the better. Not only has the Baroque invention of two sets of conditions been maintained, one for the framework program and one for the specific programs, but the so-called co-decision procedure has now been added. In the case of a framework program, this means a double reading by the European Parliament and Council plus a third reading in the event of a conflict: all this is matched by the rule requiring unanimity in the Council, which is a unique case in the Treaty.

After which, the process begins again but with more simplified procedures, for the specific programs. In this way two and a half years or more can pass from start to finish. The situation has clearly worsened in comparison with the legislative procedure laid down in the Single Act, which was not exactly a masterpiece of rationality and fluency itself.

MEDIA DUEMILA: The high definition television program has been left unfinished: Do you think a decision will be made in the next few months? And do you think the times are still right?

Pandolfi: Fortunately, only the program for advanced television has been left unfinished. Funding for the final two years of the new framework research program was approved on 22 December by the Council. This ultimate extension was granted mainly as a result of the ability and determination of the United Kingdom, which held the presidency. Consequently a further ECU900 million was allocated for 1993 and 1994.

The aspect of my work that took the most effort both in terms of concept and negotiations was high definition television and this provided the least tangible and perceptible results.

It was a three-stage journey. The first consisted of the definition of a "norm" for advanced television via satellite and high definition itself. We got there in December 1991, through a proposal of mine for the reorientation of the overall strategy. I had the difficult role of tempering the fervor and one-sided demands of

industry to take the market, and those most closely involved, the broadcasters, into account.

The second stage was an agreement among the operators in the sector regarding a planned promotion program. This was reached in June 1992 with the signing of the relative Memorandum of Understanding.

The third and last stage consisted in the legislative adoption of the plan of action, designed to ensure incentives for the years 1993 through 1996, and to support the operators' planned program. It was here that the mechanism jammed. Two meetings of the Council of Ministers for Telecommunications in one month, echoes at the European Council meeting in Edinburgh—all to no avail. On one side, 11 countries completely in agreement on strategy, on the contents of the plan of action, and on the sum of half a billion ECU. On the other side British opposition, which amounted to a British veto in an area that is governed by the rule of unanimity.

MEDIA DUEMILA: So now what will happen?

Pandolfi: It is my impression that the British position will not change until the Treaty on European Union—which is a notoriously difficult step for London—has been ratified. The “no” to high definition could be used by John Major as a further argument to prove that British interest can nevertheless be safeguarded. Meanwhile, time is passing. In its latest version, which essentially means supporting the 16/9 format with ample flexibility in norms, the plan maintains its validity and could even be resumed later. However, I would not bet on real interest in a common design being sustained much past a certain limit.

MEDIA DUEMILA: Is the world of European research which you are leaving, more united and efficient than it was when you took over in 1989? And are the information technology and telecommunications industries ready for a single competitive market when compared to their American and Japanese counterparts?

Pandolfi: The industrial scene is more critical today. Competition worldwide has become stronger, also because the economic situation is fluctuating between stagnation and recession, particularly in the field of advanced technologies, beginning with information technology. I would say that today there is comparatively more awareness within European industry of the overall nature of the challenge. There is more push toward international agreements, less inertia, a more flexible attitude toward the market, and greater perception of a role for the EC in research applied to key technologies. In other words, industry is better prepared.

Somewhat less so are the EC institutions, where research often risks being fragmented into a thousand streams, and which are reluctant to accept industrial competitiveness as a priority. Let us hope that the warning from the United States has been understood. The “technology policy” platform presented by Bill Clinton is modern, up-to-date, and aggressive. I find it contains the same

concepts, and even to a surprising extent, the same language I transferred into in the European Commission's documents in 1992. I hope there will be a fallout effect from the other side of the Atlantic.

MEDIA DUEMILA: In what way and to what extent was the situation influenced by the fall of the Berlin Wall and by the enlargement of Europe from the Atlantic to the Urals and the simultaneous breaking apart of consolidated states? And is the relationship with the “other” Europe, especially Russia, destined to be one of cooperation or competition?

Pandolfi: The best thing about my time with the EC was being able to experience the great changes of 1989 firsthand. With the fall of the Berlin Wall, the EC's future has changed. I thought so, I said so, and I wrote so, on the occasion of a memorable “reflective seminar” held on 10-11 November 1989, exactly one day after the event.

To begin with, there was just one reason for the EC's existence: the progressive integration of a prescribed number of western European countries. Now there is a second reason, that is not an alternative, but is complementary to the first. We have called it “continental responsibility.”

The events of the past three years—the unification of Germany, the phenomenon of Balkanization in Central and Eastern Europe, and the difficult changeover from controlled to free-market economies—are proof that there can be no stability for our continent without the center of gravity which is the EC. An EC which concentrates exclusively on its own internal affairs, and is reluctant to assume new responsibilities, would be a second-rate and philistine affair.

MEDIA DUEMILA: Do you believe the Treaty of Maastricht will be ratified and that European political and economic-monetary union will become reality? Or do you think the project for integration has become diluted and is sinking under the new “extended Europe”?

Pandolfi: The Treaty on European Union, which has given Maastricht its place in European history, is happening right in the middle of the time of great change or great transition if you prefer. It brings with it all its problems and contradictions. Its two basic parts—economic-monetary union and political union—are completely asymmetrical. While the hundreds of articles dedicated to EMU (European Monetary Union), are precise and detailed, it is vague, generalized, and reticent on the fundamental issue on foreign policy and joint security.

Schemes are likely to be upset by the winds of change that are blowing so strongly. Monetary union will probably be achieved starting from the nucleus of the German mark extended to the French franc. The monetary turbulence at the end of last summer has taught us that there are more realistic routes to follow than those so meticulously described in the Treaty.

As far as foreign policy and joint security are concerned, these will now carry far more weight. The Yugoslav tragedy and the continuing critical situation in areas further to the East, have shaken and alarmed the collective conscience. It is on this front that the EC or the European Union, as it will be called once the Treaty has been ratified, will play out its destiny.

The year 1992 saw a flood of doubts about EC realities assailing public opinion in Europe. The idea of a huge market is no longer enough. The policies are not enough. A political solution is required and the task will be immense.

The research sector has also been affected. Speaking of my own sector, what is needed among other things is to break down the fences of the past and create a European scientific community. In this field it is possible to move more quickly than in others. We have, in effect, made great strides by creating a well-established network with the science and research ministers in central and eastern European countries. At the beginning of December, we held a two-day conference in Vienna to relaunch a major EC initiative, which quickly became a reality, with the awarding of 2,531 scholarships to young researchers in those countries. We have also laid the foundation for cooperation along the same lines, though in more difficult and complex circumstances, with civilian scientists in the republics of the former Soviet Union.

Going back to the overall picture, the prospect of an enlarged EC has changed. It has become indispensable. It is not an alternative to integration but has become its complement, since continental responsibility will be better accomplished with the support of new countries.

MEDIA DUEMILA: Was Rome farther from Brussels when you left, or now that you have returned? And is Bergamo farther from Brussels than from Rome? In your view, is Italy still part of Europe and can it remain so?

Pandolfi: The terms of the problem have changed. Italy is, and remains, a great industrial country and an essential component of Europe. In addition, under Giuliano Amato's government we are starting to put some order back into public spending. But the problem is not his alone. It is becoming apparent, also outside the country, that a more worrying problem exists: that of the quality of the country's institutions and consequently of its politics. Even more than being a matter of economic convergence, being a part of Europe is a question of good political behavior.

It is true that there is uneasiness almost everywhere. The end of the bipolar system seems to have deprived public opinion of a system of elementary uncertainties. But proven mechanisms for alternation and exchange do exist elsewhere. In Italy, they still have to be introduced. This is the point. What is urgently needed is to reconcile public opinion with the political system. To put it figuratively and symbolically, in order to bring Rome closer to Brussels we have to bring Bergamo closer to Rome.

Wissman Interview Reported

93MI0387 Munich *SUEDDEUTSCHE ZEITUNG*
in German 25 Feb 93 p 36

[Interview with Matthias Wissmann, Newly-Appointed Federal Research Minister, place not specified]

[Text]

SUEDDEUTSCHE ZEITUNG: Research policy is now under discussion: insufficient finances were available and wrong priorities such as manned space flight were set. You're going to have to make savings. How do you intend to do this?

Wissmann: I believe my predecessor was right in the beginning to reduce direct research funding for large companies. Politics should not attempt to preempt the role of business. Certain prestige projects will also need to undergo critical examination. I shall therefore be setting not only priorities, but also specifying areas needing to receive less attention. For example: Should we be funding analog high-definition TV technologies, when there are digital developments offering better technical quality available on the world market?

SUEDDEUTSCHE ZEITUNG: To take another example, what do you think of the prestige Transrapid Rail project?

Wissmann: We shall be receiving the Transrapid consortium's proposal in March. I support this project, though only on a largely private-enterprise basis.

SUEDDEUTSCHE ZEITUNG: Research in eastern Germany has been so totally run down that industrial research, for instance, hardly exists anymore. Do you intend to change that—must you not change that? If so, where will the money come from?

Wissmann: It's true that the restructuring crisis facing industry in the former GDR [German Democratic Republic] means that even research capacities which might have had a future are threatened with collapse. This must not be allowed to happen, and the federal government has taken the necessary steps to prevent it. In the last few weeks I have managed to free up around 200 million German marks [DM] for industrial research in the new laender. I aim to provide a further DM100 to 150 million for building up modern research as soon as possible.

SUEDDEUTSCHE ZEITUNG: Basic researchers in Germany have for long been complaining that they don't receive sufficient funding. What's your view?

Wissmann: There can be no question about this. I do wonder, though, whether, in addition to the necessary discovery-oriented basic research, we shouldn't put more emphasis on application-oriented basic research. In my view, it's also important to speed up the pace of translating basic research into marketable products. The Japanese have a definite advantage here. We must not

have the same thing happen to us in the future as happened with color TVs. Where the major patents came from Germany and Europe, but global markets are now dominated by Japan.

SUEDDEUTSCHE ZEITUNG: And you don't see that as the job of industry itself?

Wissmann: I believe that the Research Minister has a moderating role in the dialog between business and politics over future developments, when there's a need to point out where our development is failing.

SUEDDEUTSCHE ZEITUNG: Restructuring always means there are winners and losers. Where do you plan to do more in the future, and where less?

Wissmann: An important example is the future course of energy policy. Firstly, we need to increase funding of technologies which assist energy-saving. We need to make coal, oil, and gas more environment-friendly. I support the peaceful use of nuclear energy. In addition, there is still potential in renewable sources of energy. I therefore intend to improve the overall conditions for renewable energy sources. For instance, I am looking into the possibility of placing greater emphasis on solar power in the new laender.

SUEDDEUTSCHE ZEITUNG: The Karlsruhe Nuclear Research Center is still spending 20 percent of its funding on nuclear technology research.

Wissmann: Karlsruhe is no different from any other large-scale research establishment in being able to count on state research funding so long as it can point to credible previous areas of research, and, above all, is developing new priorities. Funding is not provided for its own sake. My aim is to see the large-scale research establishments working more efficiently, and developing new and interesting research areas, for example in environmental or preventive research.

SUEDDEUTSCHE ZEITUNG: You will surely have to make further savings in manned spaceflight?

Wissmann: I am currently taking stock of German research policy as a whole, which naturally includes manned space flight. There are certain basic issues here, such as: Is concentration on zero-gravity the best possible approach, or shouldn't we considerably strengthen climate and environmental research through spaceflight? On 1 March we shall be signing a German-Russian spaceflight agreement. I find this cooperation, possibly extending also to the U.S. and Japan, especially interesting. Spaceflight and space research also need to justify themselves in terms of benefit for the public as a whole.

Germany: DLR To Coordinate EC-Funded Materials Science R&D Project

93MI0402 Bonn DLR NACHRICHTEN in German Feb 93

[Text] The DLR [German Aerospace Research Institute] Department of Space Simulation has successfully presented a project proposal on the "Formation of Metastable Structures in Deeply Undercooled Melts" at this year's meeting of the EC-funded BRITE/EURAM [Basic Research in Industrial Technologies for European Program on Advanced Materials] program.

This will be one of the so-called "Focused Fundamental Research" projects under the coordination of the DLR. Additional partners will be the Institute for Space Simulation of Cambridge University (UK) and Padua University (Italy). Consulting companies will be Thyssen Stahl, based in Duisburg, Germany, and Pometon S.p.A. [Inc.] in Mestre [near Venice], Italy. This is the first project to receive EC funds even for microgravity experiments on earth in the area of materials sciences.

During this year's call for bids for the BRITE/EURAM program a total of 1,158 applications were received, of which 128 were ranked as A1 (i.e. "exceptional") including the DLR proposal. The great scientific value of this project has enabled the DLR to obtain almost all the EC funds requested. The project was launched on 1 January 1993 and will be completed in 42 months.

German Aerospace Industry Calls For More Funds

93MI0412 Munich SUEDDEUTSCHE ZEITUNG in German 5 Mar 93 p 27

[First paragraph is SUEDDEUTSCHE ZEITUNG introduction]

[Text] Faced with a marked fall in demand last year, the German aerospace and defense industry has had to cut its workforce by a further 10 percent, seeing its sales drop for the first time since 1975, also by 10 percent, to 26.8 billion German marks [DM]. Speaking to journalists yesterday, Wolfgang Piller, new Chairman of the Federal German Aerospace and Defense Industry Association (BDLI), called for more state subsidies. Rather than treating sectors experiencing weak growth as "monuments to structural policy," what was required was a visionary research and technology policy for high-tech industries.

Piller blamed the drop in sales and in the size of the labor force—at the end of the year the sector employed less than 80,000 compared to 95,000 in 1990—on the sluggish civil aviation market, distortions of competition by the American government, and cuts in the German defense budget.

Pillar demanded the "American way of life" for the German aerospace industry, too: "If we in Europe fail to establish a system like the American one for indirectly

supporting research and technology, we will be unable to compete in the long term, even if we continue to build the best aircraft in the world," Piller said.

In a four-year period, the American aviation industry received more than \$100 billion in indirect subsidies. This put the Europeans at a disadvantage. Japan had made the aerospace industry "the strategic industry of the 21st century and set ambitious goals of autonomy and self-sufficiency." But in Europe we were considering pulling out of the last industry "in which we Europeans still have a clear economic lead over Japan." In the light of the indirect American subsidies, the "furious attack" by several U.S. senators and President Clinton's statements to American aircraft builder Boeing in Seattle, which was making drastic job cuts, were "hypocritical, protectionist and unfair in the extreme." Not least because the American industry had subcontracts for as much as 50 percent of the value of every Airbus supplied to America.

In military technology Piller, who is also chief executive of Deutsche Aerospace AG (DASA), Munich, part of the Daimler group, complained that four weeks after the defense review last December, Defense Minister Volker Ruehe (CDU [Christian Democratic Union]) had already ordered further cuts in the defense budget and a suspension of orders until 1995. "We have now reached a stage where the industry is unable to plan."

But the "key role" in NATO Ruehe claimed for Germany in Washington recently could only mean that "this country's foreign policy options are very much dependent on its armed forces being able to participate in the alliance and this in turn on its defense industry's ability to cooperate." The defense industry's dependence on the state gave the state a considerable responsibility towards its workforce. Piller said he could not understand Ruehe's claim that the defense minister was not responsible for industrial policy.

Strange You Wonder

Piller called on Bonn to concentrate on pioneering key technologies, demanding from the federal government "a coherent research and technology program" supported by the Defense Ministry as well. It was strange to see how much attention was being given to the adjustment process in the steel industry, an industry of the 19th century, whereas a similar amount of support for the aerospace industry, which was a key technology for the next few decades was unimaginable.

UK's Low-Key Technology Policy Criticized

93BR0413 Rijswijk POLYTECHNISCH WEEKBLAD
in Dutch 12 Feb 93 p 5

[Article by Cees van Zweeden: "Britain Has No Technology Policy; Do Not Give Financial Injections 'Because Then You Would Have To Do the Same for Everybody'"]

[Text] London—The British government is refusing to provide support for DAF's Leyland subsidiary. While the Dutch and Flemish authorities are doing everything possible to save at least the technological know-how, the British government is standing firm. The reasoning is that they cannot begin to provide cash injections because then they would have to support every company. This brings with it the question: What do policy makers in London understand by industrial policy and technology policy?

There are signs enough that the UK's industrial and technological policies are fundamentally different from those on the Continent, particularly by comparison with high-technology Germany.

"The philosophy in the United Kingdom is one of 'laissez-faire,'" says Margaret Sharp of the Science Policy Unit at Sussex University. "If industry thinks that certain innovations can yield profits, then the government's rationale is that industry should invest in it itself. In contrast to countries such as France, Germany, or the Netherlands, the government here has been refusing to pursue an active technology policy since the start of the 1980s."

'Worst Investment Decision of the Century'

This aversion to an interventionist policy has its roots in a series of spectacular failures. "The biggest example is the nuclear reactor program," says John Kay of the London Business School. "The decision to support this branch of the industry has been described as 'the worst investment decision of the century.' Immediately after World War II, the British government began to pump money into the nuclear industry. At first it seemed to be a success, and by the 1960s the first Magnox reactors had begun operations. Virtually all the millions that were invested in the development of a new generation of reactors since then have been wasted. Four years ago, when the government decided to build new reactors, they purchased American technology for the purpose."

The Thatcherites who came to power in 1979 believed totally in the free-market principle. They saw little necessity to support particular companies with an active technology policy, certainly not after having seen the failures that had occurred in the 1960s and 1970s. This was expressed primarily by a drastic reduction in the share of government R&D investments in industry. A share that until 1983, in comparison with other EC countries, was in general extremely high.

Wrongly Spent

Not only is less and less money being channeled toward the commercial world for innovation, it is also, according to the critics, being wrongly spent. "Technology policy in the United Kingdom is aimed toward high-technology projects that are often intended for military use," is the analysis of Paul Stoneman of Warwick University. "It appears from recent figures that the

government is financing 20 percent of military R&D, and only 7 percent of civilian R&D."

According to Stoneman, it is no accident that Germany's technology policy has been so much more successful. Whereas in the United Kingdom a substantial part of all subsidies go to military research, the figure in Germany does not exceed 10 percent. The emphasis in Germany, says Stoneman, lies on civilian and small-scale projects. Instead of developing new technologies, the [UK] government should promote the implementation of these technologies by industry.

One of the obstacles, say the critics, is poor vocational training. Volvo is said to have decided not to introduce its latest, most advanced models into the United Kingdom because the mechanics' educational level is so low that garages would be unable to repair the cars. In Germany, said Stoneman, technology policy is also directed toward extra training for the work force.

Companies, Too, Invest Less

"Not only are companies receiving less money from the government for R&D, they are also investing less themselves," stated Stoneman. "German industry allocates roughly 65 percent more to R&D." Industry in countries such as France and the Netherlands invests proportionately even less in general on R&D.

One of the reasons, according to Stoneman, for being so far behind Germany is the UK's business structure. "In Germany or Japan, companies are protected to a certain extent against hostile takeovers. Here, companies run that risk almost all the time, and their highest priority therefore is the share price. Boards of directors must always keep an eye on the rate, since if it drops too much there is a risk that a competitor will buy a majority of their shares on the market. This danger leads to short-term policies. Investment in R&D, which is only profitable in the longer term, is left out because in a particular year the profits could fall."

"I travel frequently in Europe," said Sharp, "but the dynamism that you encounter in Italy or Germany is completely lacking here. What we need in the United Kingdom is a government that is prepared to govern."

[Box]

Britons Oppose High-Definition Television Because of Sony Exports

"This is sabotage," said [Dutch] Minister Maij-Weggen of Transport and Public Works at the end of last year, after her British counterpart had exercised his veto against further support for high-definition television (HDTV). If Philips and Thomson wanted to continue with their "super television," said the Briton, his government would not object, but the electronics concerns should do so without EC subsidies.

For the other 11 EC countries, this attitude was incomprehensible. HDTV was one of the last weapons that Europe could have used against the Japanese electronics industry. The technology that Philips and Thomson had developed was ready. The only remaining matter was that the television companies in Europe needed to be persuaded to broadcast the pictures. For that purpose, they only had to acquire the new technology, a process which would have been very simple with EC money.

The British government remains unyielding. For Jonathan Liebenau of the London School of Economics, however, the reason for the British veto is quite obvious. For some years, he says, the UK has been a net exporter of television sets, but coincidentally, these sets are being manufactured by Philips's largest competitor, Sony. "Some Japanese companies are already beginning to regret that they chose England as a basis for aiming at Europe, and for the British government it matters very much that they should support Sony. That is very probably the most important reason for the veto."

German Ministry Announces Surface Coating Project Funding

*93MI0419 Bonn TECHNOLOGIE-NACHRICHTEN
MANAGEMENT-INFORMATIONEN in German
19 Feb 93 pp 7-9*

[Announcement by German Ministry of Research and Technology of Project Funding as Part of Selected Funding Area "Surface Coating Technologies"]

[Excerpt] Under the BMFT's [Federal Ministry of Research and Technology] "Surface Coating Technologies" selected funding area, it is intended to fund industrial fundamental research joint projects to solve inter-company, future-oriented questions in the following areas:

- Research in surface coating technologies for avoidance of lubricants
- Research in surface coating technologies for coating and treating plastics.

Industrial fundamental research here means independent theoretical or experimental work with the aim of obtaining new or improved understanding of the laws of science and technology, including their application in an industrial sector. Funding will go to such research and development work if it carries a high technical and economic risk, is particularly complex, and has to be dealt with jointly on work-research institutions. The system dictates that, aside from the technico-scientific questions, particular attention must also be paid to economic, ecological, and, if applicable, organizational aspects (e.g., work stages in production). Work packages for disseminating the results are to be provided within the associations.

I. 1. The aim of the first research project is to investigate systemic solutions on the subject of "Surface coating technologies for avoidance of lubricants." The following problems must be addressed in parallel by the joint project:

- Defining the performance profile of the system under investigation
- Design of the components and assemblies used in the research must be appropriate for coating
- Pre-treatment of substrates
- Investigating manufacturing- and environmentally-friendly coating process
- Investigating the operational possibilities of the coating system investigated
- Developing in-situ analysis and process control for high reliability, safety, and stability of the coating process
- Investigation surface analysis methods with the aim of efficiently checking the coating result
- Investigating specific coating measurement techniques (hardness, adhesion, etc.)
- Investigation possibilities of removing coating and re-coating appropriately for recycling
- Producing standardization contributions
- Work packages on technology transfer (implementation of results, diffusion)

The coating method considered is always the one offering the best solution to the particular problem. This will vary from case to case, and may be PVD, CVD, or electrochemical methods, for example.

I. 2. By way of explanation, some examples of possible selected topics for joint projects on this subject are given below.

These examples serve to illustrate how the system concept can look in the specific association. With the many unanswered questions, the following examples make no claim of completeness. Nor should the selection be regarded as prioritizing the topics mentioned.

- "Storage without lubricants:" Reduction of friction by means of a coating with its enormous effect on the technical efficiency increase can also mean dispensing with environmentally hazardous lubricants. In certain circumstances, vegetable lubricants that are biodegradable can be used, bringing the aim of low-pollutant, material-saving production one step nearer.
- "Dry machining:" In manufacturing, lubricants, sometimes used in large quantities, are environmentally polluting, and hazardous to the health of the machine operators. New coatings and coating systems must be developed so that acceptable standards can be achieved with unlubricated tools, or ones operating with water lubrication.

II. 1. The aim of the joint projects of the second research area is first to investigate systematic solutions for the following two topics:

- "Plastic coating and treatment as a barrier technology for storage systems for volatile substances"
- "Transparent anti-wear coatings on plastics for optical applications"

The following problems must be addressed in parallel by the joint project:

- Defining the performance profile of the system under investigation
- Design of the components and assemblies used in the research must be appropriate for coating
- Pre-treatment of substrates
- Investigating manufacturing- and environmentally-friendly coating process
- Investigating the operational possibilities of the coating system investigated
- Developing in-situ analysis and process control for high reliability, safety, and stability of the coating process
- Investigating surface analysis methods with the aim of efficiently checking the coating result
- Investigating specific coating measurement techniques (hardness, adhesion, etc.)
- Investigating possibilities of removing coating and re-coating appropriately for recycling
- Producing standardization contributions
- Work packages on technology transfer (implementation of results, diffusion)

II. 2. The coating method considered is always the thin-film method offering the best solution to the particular problem.

This will vary from case to case, and may be PVD, CVD, or electrochemical methods, for example, or a combination of these.

III. It is essential for a joint project under the selected funding area that the project is operated by one or more small or medium-sized enterprises.

In addition, research institutions, university institutes, and other enterprises may be incorporated in the association partners (e.g., potential user of the technology to be developed—if possible as association coordinator—system manufacturer, contract coater, measuring technology and analysis representative, substrate manufacturer, etc.).

IV. The BMFT funds joint projects according to the available budgetary appropriation. Depending on the closeness of application of the expected results, it participates in individual project costs to the tune of either 50 or 25 percent. Companies from the new German laender, and small and medium-sized enterprises may receive a contribution to the overall costs of their projects that is up to 10 percent higher. The BMFT's administration principles are taken as the basis. No legal right to funding exists. [passage omitted]

Germany: Karlsruhe Research Center Presents Program Budget

93MI0420 Bonn *TECHNOLOGIE-NACHRICHTEN*
MANAGEMENT-INFORMATIONEN in German
19 Feb 93 pp 10-12

[Text] With the 1993 program budget, the KfK [Karlsruhe Research Center] has presented its new medium-term work and financial schedules for 1993 to 1996. Under the theme of "Research for Environment-Friendly High Technologies," work on the selected areas of environment, energy, microsystems engineering, and basic research is to be continued consistently, the first three areas being expanded in roughly equal measure in the medium term, and the basic research share accounting for roughly 10 percent of total research expenditure.

The program budget for 1993 is around 674 million German marks [DM]. After deduction of its own income, the KfK's requirement from public funds amounts to DM527 million, which includes around DM58 million for shutting down nuclear plants. An important element of current research planning is the increased enlisting of third-party finance, e.g., from the research budget of the European Community and from industry, which is intended to compensate for reductions in basic financing from the German federal budget.

Owing to the shortage of funds, KfK stockholders very recently discussed developments that will lead to significant reductions in the workforce, and the termination of certain work. Provision has not yet been made for these programmatic effects in the present program budget.

In recent years, a significant structural change within the KfK has led to a more broadly based range of work. A general characteristic of the work is close collaboration with universities and international research institutions. The picture in the selected work areas is as follows:

Environment

Environmental research comprises basic research work on energy and matter transformations in the environment and changes effected by humans. Interest centers on the behavior of pollutants in the atmosphere and on aerosol research. Numerical (climatic) models are further developed to describe and predict processes in the atmosphere. So that changes in the environment can be better recorded and evaluated, selected new approaches in the area of environmental analysis are being developed, and the effects of naturally and anthropogenically generated substances on biological systems, such as blood cells or cell cultures, are being investigated. Toxicological work rounds off the program.

The work on environmental technology under the project "Low-Pollution and Low-Waste Methods" is concentrating on thermal processes for treating waste, such as domestic trash or hazardous waste, in the problem field of water, soil, and dumping. It includes development work on purifying waste gases from technical processes. The basic aim is for an environmental

technology in which less waste is created, or unwanted byproducts are reprocessed close to source. As a contribution to state provisions in this area, the work will focus closely on the public requirement, such as that of the laender disposal corporations, and open up opportunities for the state to standardize waste and pollution prevention regulations.

A new work project is studying the use of supercritical fluids, such as supercritical water, and electrochemical processes for treating hazardous waste. Systems analysis studies and technology impact assessments complete the environment program.

Energy

Work under the Nuclear Safety Research on Reactor Safety project aims to better the future prospects of this energy source by achieving constant improvements in the safety of nuclear reactors.

This includes collaboration in formulating the safety strategy for pressurized water reactors of the next generation in a Franco-German joint venture, and development of innovative systems. Development work on the fast breeder reactor will terminate at the end of 1993.

Work on nuclear disposal concentrates on the long-term safety of ultimate storage with the design and optimization of barriers against the propagation of radio nuclides in ultimate storage. Techniques for the treatment and safe disposal of radioactive waste, especially for the direct ultimate storage of burned-out fuel elements and the demolition of decommissioned nuclear facilities, are also being produced.

With its work on nuclear fusion reactor technology, the Nuclear Research Center is making an important contribution to the European Nuclear Fusion Development Program. The solution to these technical problems is of crucial importance to the future feasibility, economic efficiency, environment-compatibility, and political acceptability of this energy source, which may perhaps be available from the middle of the next century. The work on superconductivity, especially the development of high temperature superconductors for technical applications, is making an important contribution to nonnuclear energy technology. Apart from the electricity supply field, new applications are also to be found in microsystems engineering.

Microsystems Engineering

Microsystems engineering promises to become one of the key technologies of the 20th century, and it is now in the initial stages of a promising development. By combining significant parts of the former solid-state and materials research, handling techniques, and microengineering programs, the KfK formed the microsystems engineering program as a third priority area in 1992. The basis here is the LIGA method developed by the KfK,

which is used to reproduce three-dimensional components in the micrometer range, and manufacture them with high precision.

With the right material developments and an intelligent integration of sensory devices, information processing, process control, and handling techniques, completely new applications will be opened up for this area in medical engineering, where "minimally invasive surgery" promises a significant reduction in undesirable consequences and problems for the patient following surgery.

Basic Research

At the Nuclear Research Center, basic natural science research is the link with the science faculties at various universities, and a proven means of furthering future academics. Currently, work in this area is concentrating on three large-scale astrophysics experiments on neutrino and particle physics, and on the physics of materials at high temperatures and pressures.

Apart from the research and development program, technology transfer to medium-sized industrial and small enterprises, as successfully practised by the KfK for over 10 years, deserves special mention. Unlike major projects, in which complete technologies are developed in close collaboration with industry in accordance with research policy objectives, this is where the spin-offs from major projects, which do not follow them up further, are exploited in industry. The areas on which this technology transfer concentrates reflect the KfK's wide spectrum of knowledge and experience.

Germany: Scientific Research Prospects in Saxony Reviewed

93MI0435 Bonn DIE WELT (Welt Report Supplement) in German 9 Mar 93 p WR7

[Article by Michael Simm: "The Free State Intends To Take First Prize in Research—Numerous New Institutes and Universities Will Grace the German Scientific Scene"]

[Text] Great intellects such as Alexander von Humboldt, Johann Wolfgang von Goethe, and Wilhelm Leibniz brought honor to the universities of Saxony long before the word "communism" had been coined. Later, in GDR times, quantity rather than quality was the criterion: With its 70 technical and engineering colleges, the Free State of Saxony bore the main burden of academic training in the workers' and peasants' state. A new start is now being made with the four universities of Dresden, Leipzig, Chemnitz, and Freiberg and five technical colleges, the long-term aim being to excel once again not only in teaching, but in research as well. Over half of the 2,132 professorial chairs have been permanently filled, and about 13,500 employees are currently working in higher education in Saxony.

A new emphasis will be laid on nonuniversity facilities. A "Leipzig-Halle Environment Research Center" has been

funded to the tune of 45 million German marks [DM] over the last year and is using the superabundance of practical examples available for study on its doorstep to develop reclamation techniques for contaminated soils. The 335 employees of this federally financed national research institute will also address other environmental problems faced by highly polluted conurbations, such as which pollutants are discharged by industry and how they are transported in the soil, water, and air. The Institute of Tropospheric Research and Atmospheric Physics in Leipzig is also working on air pollution.

The Max Planck Society, Germany's best-known research organization and most successful hothouse for Nobel prizewinners, is actively involved in Saxony. Three teams in Dresden and Leipzig totaling 40 employees are being funded over five years to work closely with Max Planck institutes in the original federal laender.

Dr. Helmut Eschrig heads a team at the Technical University of Dresden working on the "theory of complex and correlated electron systems." The physicist's mathematical equations will contribute to a better understanding of, among other things, the way superconductors work. These promising substances conduct electricity without frictional losses at very low temperatures.

Crack propagation is of relevance to mankind in general, as we know from the latest debate regarding safety at German nuclear power stations, if nothing else. The "mechanics of heterogeneous solids" team at Dresden University aims to acquire a better understanding of the rules that govern the formation of such cracks, so as to contribute to the development of new materials. Their know-how is also sought after, however, in the rare cases where crack formation is actually desired, for instance in the exploitation of geothermal energy, where cold water is pumped into warm rock. The deeper and more ramified the cracks, the more geothermal energy can be obtained.

The application-oriented Fraunhofer Society has established three research facilities in Chemnitz and Dresden. Production process automation is the topic in Chemnitz, where the aim is not only to raise economic efficiency but to achieve an employee-friendly working environment as well.

The Fraunhofer Institute of Ceramics Technologies and Sintered Materials (IKTS) in Dresden is working on the production of high-performance ceramics, while a second facility in Dresden, the FEP is working on combatting the mounting waste dumps with electron-beam and plasma technology. Biologically degradable foils will be widely used in the future, but are often not yet able to prevent foods from drying out or spoiling.

The minutely thin silicon dioxide films that the FEP is vapor-depositing onto meter-wide foil are expected to combine biological degradability with improved barrier properties. If the project is successful, the conventional compound foils consisting of up to seven plastics could well soon be a thing of the past.

EC Supports Digital HDTV Standard

93BR0437 *Antwerp DE FINANCIEEL-EKONOMISCHE TIJD* in Dutch 12 Mar 93 p 10

[Article signed P.L.: "EC Commission Finally Opts For Digital High-Definition Television—European HD-Mac Standard No Longer Only One Possible"]

[Text] Brussels (TIJD)—The European Commission officially stated yesterday that the European standards for the development of high-definition television (HDTV) were no longer the only ones possible. The Commission firmly opted for the HDTV system developed in the United States, thus hoping to break down British resistance to a European HDTV program.

When it became apparent that Denmark, the current president of the EC Council of Ministers, had also opted for the digital solution, EC Commissioner Martin Bangemann [industrial affairs, information and telecommunications technology] and Joao Pinheiro [culture and audiovisual] yesterday undertook to speak in no uncertain terms. In a joint statement they declared their solidarity with the Danish efforts to reach a compromise within the Council of Ministers on the development of HDTV. This compromise was off limits in recent months because of British resistance to the EC's existing HDTV action plan, which aims to develop wide-screen television (format 16:9) on the basis of a European standard: HD-MAC, with the D2-MAC as an interim standard. The non-digital standards were rejected by the British, who see more promise in the digital standard on which work has been done in the United States.

Both the Danish government and the EC Commission have therefore drawn the British card. In a letter addressed to all EC countries, Helge Israelsen, the CEO of the Danish PTT [Telecommunications Authority], warned of chaos in the event of failure to choose the digital standards. He proposed that the ECU500 million earmarked for the EC action plan be used to produce HDTV programs. The EC directive on HDTV must be adapted to permit various technologies to broadcast HDTV programs, and a single digital standard or a family of such standards has to be developed.

Wide Screen

While the EC action plan is aimed at developing both broadband television (16:9 format) and the European HDTV standard, the EC Commission is now letting the HD-MAC standard go. The race is now on to develop wide-screen television. The transmission method, technology, or standard are no longer important. The very first task is to develop good wide-screen appliances and produce HDTV programs. Should the standards have to be modified later on, only the decoder in the wide-screen appliance will have to be replaced.

According to Juan Majo, the Commission's HDTV specialist, the work done up to now in developing the HD-MAC standard will not have been for nothing,

because 80 percent of it will prove useful for any other strategy, including the digital one. Incidentally, everything in the HD-MAC is digital, except the transmission system. There were protests this week from the Belgian HDTV lobby at the abandonment of the European standard.

Justifying their change of tack, Bangemann and Pinheiro stated that the digital technology is already playing a major role in the television sector. The same applies to digital transmission technologies. After all, in this way both terrestrial broadcasts and satellite or cable broadcasts are possible. The analog HD-MAC and D2-MAC standards are incompatible with terrestrial broadcasts.

Although cooperation on transmission with third countries will be encouraged, this does not yet mean that a single worldwide standard will have to be selected. In other words, we can stick with various standards, which will increasingly incorporate more common elements.

France Investing in Microsystems Project

93BR0438 *Paris ELECTRONIQUE INTERNATIONALE* HEBDO in French 18 Mar 93 p 8

[Article signed D.G.: "Call for Proposals in Microsystems"]

[Text] Three French Ministries (Industry, Research, and Defense), as well as ANVAR [National Agency for the Implementation of Research] have issued a call for proposals in the field of microsystem technologies and devices; the deadline is 2 April.

Many developments and applications are expected in the field of microsystems. These are devices that integrate sensor, signal processing, and actuator functions.

From an economic point of view, what is at stake is gaining access to new markets (biology, medical) and increasing France's presence in the area of security...provided the manufacturing processes thus developed are inexpensive.

In an attempt to contribute to the development of new microsystem technologies and manufacturing processes, the Ministry of Industry and External Trade, the Ministry of Space and Research, the Ministry of Defense (DGA/DRET [Armed Forces Equipment Authority/Research Studies and Technologies Directorate]) and ANVAR have decided to issue a joint call for proposals. The available budget is estimated at 70 to 80 million French francs [Fr] (the actual amount has yet to be determined).

Low-Cost Batch Manufacturing Processes

Statements of intent must be filed before 2 April. ANVAR and the Ministry of Industry and External Trade will give preference to projects covering joint manufacturing processes that will give project participants access to the miniaturization and integration technologies needed to develop microsystems. The Ministry

of Space and Research will favor cooperative projects with a lifespan of at least two years that involve manufacturers and research centers. As to the Ministry of Defense, it will concentrate on programs with potential military applications.

Proposals will study the basic technologies needed as well as equipment needed for the development of microsystems, microsystem devices, and/or microsystem applications. Research work thus taken into consideration will relate to microsensors, signal-processing electronics, microactuators, and the integration of all these elements on a single substrate and the development of low-cost batch manufacturing processes. Such processes include: micromachining, 3D-assembly, manufacturing sensitive membranes and layers, grafting, micro-optics and integrated optics technologies, electrical and optoelectronic interconnection technologies, integration of VLSI [very large-scale integration] and hybrid technologies onto the model, as well as the development of optoelectronic microsources. Studies on simulation models and tools will also be considered.

Project proposals may also deal with the development of microsystem prototypes or products, rather than research. Whenever possible, these must demonstrate a progressive integration potential that is ultimately compatible with that of VLSI or hybrid technologies. Specifically, the devices targeted by the call for proposals are: micromechanisms (microsensors, microactuators, active optics); electromagnetic and chemical microsensors; biosensors; microcells; supercapacitors; energy-generating transducers; and multifunction systems.

Proposals for the "applications" stage must involve the use of microsystems in existing or new markets. Every domain of activity will be considered: automobile; automation; telecommunications; computers and peripherals; safety and the environment; the agro-food industry; biological and medical engineering; home robotics; aeronautics; space; and weapons. Proposed microsystems must meet the requirements of distributed computer architectures and take standardization issues into account.

France Coordinates Fuzzy Logic Research Activities

93BR0440 Paris ELECTRONIQUE INTERNATIONALE HEBDO in French 18 Mar 93 p 12

[Article by Henri Pradenc : "Fuzzy Software: French Mobilization in Fuzzy Logic"]

[Text] The French are getting organized in an attempt to beat the Japanese in top-of-the-line fuzzy systems applications. The "Fuzzy Logic CRIN [Research-Industry Coordination] Club" has more than 700 members and five active working groups.

About a year ago the ECRIN [Exchange and Coordination Between Research and Industry] association created the CRIN Club with a view to supporting exchanges

between researchers and manufacturers in the field of fuzzy logic. Does this imply that fuzzy logic is at long last being taken seriously in France? One thing is certain: French academics believe in the top-of-the-line applications of fuzzy logic, which is apparently also the case of the Japanese. Consumer applications—a focusing device for a camera or a temperature-control system for shower water, for example—are dismissed as mere gadgets. Today, Japanese researchers are interested in less flashy but technologically more "noble" applications. Among other things, this trend can be seen in the fact that all of the 10 major projects of the Japanese LIFE (Laboratory for International Research on Fuzzy Engineering) consortium pertain to control systems. In France, some research work has been done in various university laboratories, and some manufacturers, such as Thomson and Telemeanique, have shown interest in fuzzy processors. Now is the time to get organized in order to increase efficiency and avoid overlap. Such a mobilization should provide a broad outline for future fuzzy technology projects. However, one should not expect anything before the end of the year. The Fuzzy Logic CRIN Club gives priority to applications. A message which researchers would like to pass on to manufacturers is that they do have solutions to problems that the latter have not been able to solve.

All Sectors Involved

It is encouraging to note that 55 percent of the 700 or so members of the Fuzzy Logic CRIN Club are manufacturers. Last September, the club's executive committee set up five working groups with 20 to 30 members each. One of these groups focuses on quality control and manufacturing process improvement through the subjective observations of workers in a manufacturing plant. Also in the field of manufacturing, another topic deals with process control based on the input from traditional or fuzzy sensors using fuzzy controllers or others.

Another topic pertains to transport, a field in which PSA [Peugeot], one of the forerunners, has already developed fuzzy logic-based braking protocols for cars.

Another working group is looking at fuzzy logic-based diagnostics; potential fields of application include the human body and industrial systems. Among other topics are file management by a company's human resources department or by an insurance company, or the search for an apartment based on vague or changing criteria.

The club is considering setting up a sixth working group on decisionmaking assistance. "Tangible results may be expected in one or two years," says club official Roland Mas. The club's mission does not include training; this is what the CNRS [National Center for Scientific Research] Formation [training] is about. This organization has provided the club with training programs and premises intended for automation engineers willing to follow introductory and advanced courses. The club also acts as a "clearing house" by bringing together fuzzy logic experts and engineering schools and Chambers of

Commerce that want to establish courses or conferences. Other activities of the Fuzzy Logic CRIN Club include monitoring the work of the LIFE consortium as well as patent scanning. Japanese industry has locked up many market niches by filing patents, and the goal here is to find potential loopholes or ways to circumvent these patents.

French Colleges Provide Inexpensive Electronics Services

93BR0442 Paris *ELECTRONIQUE INTERNATIONALE*
HEBDO in French 18 Mar 93 p 16

[Article by Raphael Font: "Junior Electronics Enterprises Are Getting Stronger"]

[Text] Designing ASICs [application-specific integrated circuits], cards, sensors, and interfaces and carrying out market studies.... To companies shrewd enough to use their services, the "Junior Enterprises" of French electronics engineering schools prove quite valuable... and at affordable prices.

Although they are only a very small branch of the electronics industry, the "Junior Enterprises" (JE) of French electronics engineering schools—whose aims are both educational and commercial—can be very useful to a company active in the field of electronics applications. Students who within their electronics engineering schools run these enterprises offer services such as designing logic or analog circuits, ASICs, interfaces, sensors, and microprocessor cards and carrying out studies in signal- or image-processing, high-frequency electronics, power electronics....

Small Businesses Are Major Customers

Studies usually end at the prototype stage, but sometimes go on to include manufacturing specifications. "Customers often turn to us when their research department cannot take on more work," notes G3E President Sylvain Faure (G3E is the JE of the ESIEE [School for Advanced Electrotechnical and Electronics Engineering]).

In total, the 25 or so JEs which agreed to take part in our survey will have carried out more than 100 electronics studies (among those few junior enterprises which declined to take part in our survey are ESIGELEC [School for Advanced Electrotechnical and Electronics Engineering] (Rouen), ESIEA [Institute of Higher Learning in Information Science, Electronics, and Automation] (Paris), and INT [National Telecommunications Institute] (Evry). One new JE is being created at the ENIC (Villeneuve d'Ascq)).

Small- and medium-sized companies make up about 60 percent of their customer base, with large companies representing 20 percent and government organizations another 20 percent. Among the 1992 customers are the Electronic Weapons Systems Center (JE "Ouest INSA [National Institute for Applied Sciences," from INSA-Rennes), Alcatel Radiotelephone (JE "GER Telecom"

from ENST [National School for Advanced Telecommunications Studies]-Bretagne), and Renault (JE "N7 Projets," from ENSEEIHT [Toulouse National School for Electrical Engineering, Electronics, Information Science, and Hydraulics]-Toulouse).

Not surprisingly, the JE which achieved the best sales figures last year in the field of electronics is that of SUPELEC, the main French electronic engineering school, with 292,000 French francs [Fr] (24 percent of the total sales of this JE).

The sales figures in electronics of all French JEs taken together totaled about Fr2 million in 1992, or between Fr15,000 and Fr20,000 per contract. Some JEs, however, have achieved results significantly higher than this average figure: Fr36,000 for GERS (from ESME-SUDRIA [Specialist School for Mechanics and Electrical Engineering]) or Fr40,000 for Intersystemes (from the Science and Technology Institute of the Pierre-et-Marie-Curie University in Paris), for example.

"We charge Fr1,300 per day of work," says Oriana Bohbot, the president of Synergie, the JE of Lyon's ICPI [Chemistry and Industrial Physics Institute]. "On average, our contracts are worth about Fr10,000 with small businesses, from Fr15,000 to Fr20,000 with government organizations, and Fr30,000 with large companies," notes Yann Robin, the president of SUPELEC's junior enterprise SEP. Some 15 SUPELEC students participate every year. "They are seldom first year students," Robin adds. "More often than not, they did not go through preparatory schools, but they already hold a DUT [Technology University Degree], a Master's Degree, or an Engineering Degree from another school." Electronics studies commissioned to JEs vary widely: a control card for a refrigeration system; electronic modules for an educational game; tractor gearbox elements; a dog collar fitted with a microprocessor.... More prestigious, one project entrusted to G3E by Schlumberger called for designing a microwave transmit/receive (T/R) module—a 45-day study worth Fr60,000. Among the more important studies recently carried out by an electronics JE is one commissioned by La Poste [French public postal service] to Telecom-Etude, the JE of Telecom Paris: 100 days, Fr200,000. The aim of the study was to develop a microprocessor mailbox with LCD [liquid-crystal display] and solar-recharged battery.

But JEs offer services beyond electronic applications design. Many of them can also perform market studies, often in cooperation with JEs from business schools: for example, Synergie, the JE from Lyon's ICPI, has links with Chambery's Higher Business School. Another example: last year, two members of G3E carried out a two-week market study on PABXs [private automatic branch exchanges] for one manufacturer.

As to [SUPELEC's] SEP, it recently handed in to a French manufacturer a comprehensive report on the

global status of microwave research. Worth Fr110,000, the study kept two students busy for a four-month period, including trips to Italy, the United States, and Japan. Lastly, one small bit of advice: If you are tempted to resort to JEs, be aware that you should avoid calling on them during two periods of the year: exam time and... the summer vacations. "July and August are the worst," laughs one JE manager.

CORPORATE ALLIANCES

Matra Datavision Plans Alliances Abroad

93WS0314B Paris *PRODUCTIQUE/AFFAIRES*
in French 10 Feb 93 pp 1, 10

[Article: "Matra Datavision To Reinforce Its Foreign Alliances Network"]

[Text] The Matra Hachette group's subsidiary Matra Datavision, specialized in software and CAD/CAM systems, is projecting a positive net result for 1992, after a net profit of 4.7 million French francs [Fr] in 1991. Its revenue was Fr500 million last year, up from Fr447 million in 1991. Following a number of acquisitions in 1992, including Lyon-based CRLF and Sediscad (Fr62 million of revenue in 1992), Matra Datavision, headed by Michel Neuve Eglise, now plans to reinforce its network of sales representatives and alliances abroad, especially in the United States, where it already has 40 dealers and will endeavor to form alliances with local firms. Last year, its sales outside of France (Fr280 million) exceeded those within France. Michel Neuve Eglise states that its recent merger with Matra-Hachette does not in any way modify the day-to-day operation of his group, which is 75 percent-owned by SFMRA (65 percent Matra Hachette, 35 percent Renault), 4 percent directly by Matra Hachette, 8 percent by BNP [National Bank of Paris], and 6 percent by its personnel. On the other hand, he expects to benefit from the strong financial position of Jean Luc Legardere's group. "We are now in a position to exercise greater influence in our relations with others," he says, and he plans to turn this asset to good use in his drive to expand in international markets. As to possible synergies, he evokes especially the communications sector, together with Hachette. The company's France and Benelux operations directorate is headed by Denis Sempere. The marketing directorates consist of three entities: the automotive market (Jacques Raud), the aerospace, defense, and engineering market (Paola Pellizon), and the mechanical, electromechanical, education, and research market (Michel Gruber). Thierry Champetier de Ribes heads its Directorate of VAR [Value-Added Dealers] Europe Operations.

Matra Datavision (Alain Roumiguier) - 31 Avenue de la Baltique, 91940 Les Ulis. Tel. (1).69.82.24.00.

Matra Datavision Signs Distribution Agreements

93WS0314C Paris *PRODUCTIQUE/AFFAIRES*
in French 10 Feb 93 p 3

[Article: "Agreement With Top Log and New Availabilities of Euclid 3D"]

[Text] Matra Datavision and Top Log France have signed an agreement concerning the distribution of Prelude Personal Systems, a Volumique 3-D CAD solution on UNIX platforms. Under this agreement, Top Log will handle the promotion and distribution of these systems in France, following a successful launching of the line in the United States (Prelude/Solids, Prelude/Drafting, Prelude/Interfaces). Top Log France is a subsidiary of the Top Log International group, formed in 1986, and currently the leading independent European distributor of software under UNIX with associated services. The group is present in five EEC [European Economic Community] countries. It employs more than 180 persons, had a revenue of 215 million French francs [Fr] in 1992, and is projecting a revenue of Fr320 million this year. Prelude is a solution designed for the PME/PMI [Small and Medium-Sized Business/Small and Medium-Sized Industry] sector, as well as for firms or departments seeking personal-system solutions. It is available on Sun Microsystems and Silicon Graphics platforms. Following the signing of the agreement by Matra Datavision and Hewlett Packard last November covering worldwide cooperation between the two firms, the French group has also announced the availability of its CAD and CAD/CAM softwares for Hewlett Packard and Digital Equipment's Alpha work stations, as of this June. The agreement covers two primary facets: availability of Euclid 3 and different customized solutions (Drawmaster for design; Surfmaster for machining; Foldmaster for sheet metal work) on HP 9000 Series 700 work stations and servers; and the setting up of a marketing and commercial program for the distribution of these complete solutions through the Matra Datavision international network.

Matra, Cap Gemini Subsidiaries Merge

93WS0314D Paris *PRODUCTIQUE/AFFAIRES*
in French 10 Feb 93 p 3

[Article: "Matra and Cap Gemini Create Matra Cap Systemes"]

[Text] The Matra and Cap Gemini Sogeti groups have signed an agreement ratifying the merger of their subsidiaries MS2 I [Matra-SEP Imagery and Information Processing] and Cap Sesa Defense, which specializes in defense information processing. Baptized Matra Cap Systemes, and installed at Velizy, the new company will have a revenue of around 900 million French francs [Fr], will employ 900 persons, and, initially, will be owned in equal proportions by the two groups. A clause in the contract, however, provides that Matra will be responsible for the new company's strategy, and will, on a date certain, assume its leadership. A blueprint that tallies

with the ambitions entertained by Jean Luc Lagardere for the new Matra-Hachette group. The identity of Matra Cap's first chief executive has not been revealed as yet. It could be Yves Veret, the current president of Cap Sesa Defense, to whose launching he contributed, and who is an acknowledged military information processing expert. The new company will specialize in defense information processing, and particularly in software for data processing, image processing, cartography, and mission preparation. Matra Defense's stake could be increased in the future, inasmuch as Matra MS2 I, in which SEP [European Propellant Company] had a 35 percent stake until January 1992 that was bought back last year, has a veritable array of orders. In the civil sector, it processes the Spot, Landstat, and Meteosat satellites. For the military, the company is to provide the ground system of the pilotless Brevel observation plane and its Datalink data transmission network, different SICs [scientific information centers], and information and control systems, including that for the Leclerc tank, for which it has created a GIE [economic interest group] (Macs), precisely together with Cap Sesa Defense. It is to be noted, however, that, should Cap Gemini Sogeti's capital stake be modified, Matra would automatically up its stake in Matra Cap Systemes. The clause also concerns Daimler Benz's advent in 1991 at the level of a 34 percent stake in Sogeti SA, and the probable advent of a France Telecom stake in Cap Gemini Sogeti.

Germany: DASA, Fokker Reach Agreement

93MI0396 Munich SUEDEUTSCHE ZEITUNG
in German 15 Feb 93 p 4

[First paragraph is SUEDEUTSCHE ZEITUNG introduction]

[Text] The takeover of the Dutch aircraft manufacturer NV Royal Dutch Aircraft Factory Fokker, of Amsterdam, by aviation group German Aerospace AG (DASA) of Munich, has been completed. Dutch Trade Minister Frans Andriessen has agreed to DASA's demand for additional financial help for Fokker, except for one point: The Dutch government will not provide any money for Fokker to be reorganized. According to Andriessen, "this would mean a blank check, which we can't afford." Fokker Chairman Erik Jan Nederkoorn welcomed the agreement, which he said ensured Fokker's future existence.

Only last week there was still great uncertainty in the Hague as to whether the government would sign the takeover agreement, as DASA had made new demands. Only after pressure from Fokker and the labor unions represented there did Andriessen give his agreement: "It was a decision we were not happy with. The Germans have behaved very pettily. I would never have believed such a major economic power would have such finicky negotiators. I'd never have been involved in anything if there had been time to seek another partner for Fokker, and if the Amsterdam manufacturer's financial state had

not been so precarious. The main problem is the stockpile of 29 new F-100 aircraft worth a total of 14 billion German marks [DM] currently awaiting buyers. Nederkoorn confirmed the urgency of the situation and admitted that there was no money left, as the banks were refusing any further loans to the troubled company.

Over the past few weeks, DASA, presumably under pressure from its parent company Daimler-Benz, and after seeing Fokker's books, has pitched its demands sky-high. The Dutch government has agreed to all of DASA's demands, refusing only to issue a blank check in the event of reorganization at Fokker. Under the takeover agreement, the Hague will increase Fokker's assets by 180 million guilders, and the state will underwrite an issue of convertible debentures up to 334 million guilders. DASA is paying 683 million guilders for its 51-percent stake in Fokker, or around 200 million guilders less than the takeover price originally negotiated on 29 October 1992. This amounts to 30 guilders per share for a total of 13.2 million new shares (the shares were quoted on the American Stock Exchange on 12 February at 10.50 guilders). DASA is buying the Fokker shares in two lots, the first 5.3 million-lot costing 23 guilders. Neither lot will be transferred until 1995.

DASA's payment will be dependent on Fokker's profits performance. If it is below the expected increase of at least 5 percent over the next three years. DASA will be exonerated from paying 166 million guilders. Fokker chief Nederkoorn, however, states optimistically that "our survival is assured." Fokker's financial director, Rene Hendriksen, regards the agreement as "a fantastic deal."

France: Framatome's FCI Acquires Alcatel's Connector Division

93BR0417 Paris ELECTRONIQUE INTERNATIONAL
HEBDO in French 11 Feb 93 p 11

[Article by Florence Ladouce: "FCI [Framatome Connectors International] Takes Control of Alcatel's Connector Activity"]

[Text] After a breakthrough in the automobile sector, Framatome's connector subsidiary shapes its telecommunication position by taking control of the connector division of Alcatel CIT.

Following the 1989 formation of Framatome Connectors International [FCI], the possibility of integrating Alcatel's connector activities into this French connector giant has often been raised. This time, the merger will certainly occur. Framatome's subsidiary and Alcatel have just announced the conclusion of an agreement in principle stipulating that FCI will take control of Alcatel CIT's connector division. It is located at Pontarlier, in the Doubs department (around 300 people with a turnover of roughly 200 million French francs [Fr]). According to the agreement, which must still be approved by the appropriate social authorities, Alcatel CIT will initially subsidize its connector activity and

subsequently transfer 66 percent of this subsidiary's capital to FCI, keeping the remaining 34 percent itself.

More Than Half the Group's Internal Sales

There are various reasons behind this strategy of the world number one telecommunications company [Alcatel]. On the one hand, connectors do not form part of its core activities. On the other, in the current context of ever higher R&D investment requirements in the connector industry, the Pontarlier plant, which is specializing in telecommunications connectors and sells half of its output within the Alcatel group, would have had no bright future all by itself. Back in 1989 already, Jean-Yves Guegan, the then director of the Pontarlier plant, pointed out the necessity to eventually take on a partner in connectors. "We do not have the resources to develop the connectors of the future all by ourselves," he said at the time. According to Francois Guiavarc'h, the current plant director, several partnerships with companies other than FCI were examined, but none of them sprouted. Nevertheless, this has not held back Alcatel from further investing Fr20 million per year in Pontarlier. This enabled it to produce the DIN and HE17 connectors as well as the connectors needed for Alcatel's S12 telephone exchanges (connectors for which Alcatel obtained a license from Burndy before its transfer to FCI). At the same time, it stepped up development work on a range of connectors for networks (plugs and accessories), chip card connectors (GSM [global system for mobile communications] applications, access control, etc.), and power supply devices (energy distribution). Francois Guiavarc'h anticipates a turnover of Fr190 to Fr200 million in 1993 for the Pontarlier plant, which has just transferred its coiling activities (which represented about 20 percent of the plant's Fr190-million revenues in 1989 and does not fall within the scope of the agreement with FCI) to Portugal. For FCI, the agreement concluded last week shows once again its desire to reach a critical mass. After having secured a place in the automobile sector by taking over the German Daut & Riets (Fr330-million sales figure) last month, the French giant (over Fr3.4 billion including Daut & Riets), which was unsuccessful in taking over Du Pont's connector division, improves its position in telecommunications connectors. With the contribution of Alcatel's activity, its turnover in the sector rises from Fr400 to Fr600 million. It also takes the number one place in France (ahead of Du Pont) and number two in Europe (after AMP) in the connector market for telecommunications applications. Furthermore, FCI is expanding its range of telecommunications products (previously, it had no network connectors and not as large a range of chip card connectors).

The new agreement, which will reinforce the already strong links between FCI and Alcatel, cannot but be beneficial to the Framatome subsidiary. Without doubt, the most difficult aspect for it will be to reconcile the different cultures within the group. This is a problem it has been facing ever since its creation....

CORPORATE STRATEGIES

German Chip-Makers Want Enhanced State Support, Cooperation With Users

93WS0259B Duesseldorf VDI NACHRICHTEN
in German 15 Jan 93 p 1

[Text] Four major producers and users of semiconductors are calling for a "new trend in microelectronics" in a working paper on industry and politics. In this document, which is called a "consensus paper," Siemens, IBM Deutschland, Daimler Benz and Bosch speak in favor of a significantly closer cooperation between user industries and semiconductor manufacturers to assure "unmanipulable access to modern microelectronics."

For the German microelectronics industry to remain attractive for global partnerships, the four companies believe that a coordinated approach is necessary: "Reciprocal specialization of the larger companies is a very promising way to begin offering the semiconductor or communications technology best suited to each individual case and to achieve the inventory sufficient for economical manufacture."

They say that the situation in semiconductor technology is alarming. The five largest Japanese firms (Toshiba, NEC, Hitachi, Fujitsu and Mitsubishi) are said to have a production share of over 50 percent in all market segments, in the case of storage more than 80 percent. It is claimed that Japan controls important base technologies monopolistically. "German industry has to purchase an increasing share of its microelectronics needs from potential competitors, who regard this technology as a strategic competitive advantage," as is stated in the paper which was produced for the "Microelectronics" discussion group initiated by Federal Minister for Research Riesenhuber. Because of this dependence it is said that the user industries may suffer significant disadvantages. One example given is the behavior of leading chip manufacturers at the end of the eighties. At that time they did not fulfill their supply obligations or did so only after a delay.

The state is called upon to eliminate competitive distortions. Attractive investment assistance, lower hiring costs and corporate taxes, and more flexible working hours in other countries are among the competitive distortions named by the working paper. It claims that until local conditions in Germany improve compensation must be found for the companies.

In addition it is suggested that an industrial policy committee be set up to promote microelectronics. It could agree on measures and recommendations in individual cases which would then have to figure in the plans of the companies, the government, the unions and policy-makers. The text reads: "Industry needs guidelines in making plans for research, development and production which are reasonable, can be implemented promptly, and are reliable in the long term."

The paper is currently being discussed by the industry associations. The chief issues which are in dispute are the industrial policy suggestions of the four giant companies. In the opinion of Gotthard Grass, spokesman of the electronics association ZVEI, the impression should not be given that foreign manufacturers are to be barred from the German market. He also said that it is extremely difficult in practice to get all the companies in an industry to subscribe to a common policy.

SGS-Thomson's Nonvolatile Memory Market Share Increases

93BR0416 Paris *ELECTRONIQUE INTERNATIONALE*
HEBDO in French 11 Feb 93 p 8

[Article by Francoise Grosvalet: "SGS-Thomson Wins Shares in the Memory Market"]

[Text] The objective of the French-Italian firm, which had a small profit in 1992, remains one of the top 10 semiconductor suppliers in the world.

Last week in Paris, reviewing the figures for SGS-Thomson's first five years of operation, SGS-Thomson President Pasquale Pistorio stressed the increased market share in nonvolatile memories. According to Jean-Philippe Dauvin, head of the firm's economic studies, this type of memory will have the highest growth in the five years to come (averaging 15 percent per year, versus 13 percent for DRAMs [dynamic random access memory] and 12 percent for all memory types), although in absolute figures the volume generated by DRAMs will remain much larger during this period. As for flash memories, for which demand is increasing, the French-Italian firm does not foresee lagging behind its competitors (AMD and Intel) and says it is ready to mass produce 1-Mbit flash memories before the year's end. Production of 4-, 8-, and 16-Mbit models is planned to begin within 12 months, "exactly in time, compared to the competition," stated P. Pistorio.

Good Outlook for 1993

During this press conference, Pistorio also announced the 1992 results. For the second time in its history, SGS-Thomson cleared a post-tax net profit of \$3 million, and a \$127 million operational profit. These figures compare to a \$6 million operating profit and to a \$102 million net loss in 1991 (due to restructuring and financial costs). From the \$127 million 1992 operational profit, \$50 million was devoted to restructuring. Another \$65 million went to interest payments on debt, which by the end of 1992 hit \$808 million (before the current recapitalization operation being prepared by French and Italian shareholders). The rest went for taxes. "The restructuring period is over," for the medium term, stated Pistorio. The 1993 results should be much better for the firm, whose end goal remains capturing about 5 percent of the world market, the only way "to obtain

stability and take a place among the top 10 in the world." An ambition that Pistorio thinks will be achieved by the end of the decade.

To reach this goal, the firm will adopt "a more aggressive" investment strategy than it has had over the last few years (\$250 million in 1992). For this, the current recapitalization should allow for accelerated investment, in particular in the Crolles factory, which should be operational by mid-1993.

SGS-Thomson's problem of not having production capacity for DRAMs is no longer of great significance. "These memories in the last five years have lost much of their interest for our firm," stated Pistorio, "for two reasons. First, their production in Europe is no longer strategic, as they are already produced in Europe, the United States, Japan, and Korea. Next, they became one of many technological vehicles; our nonvolatile memories fill this role perfectly. Having said that, the DRAM market remains very important, and we would tackle it if a partnership opportunity presented itself to us. But, even if a partnership came about, we still would prefer it to be in the CISC [complex instruction set computer] microprocessor area.

[Caption to graphic; graphic not reproduced]

In the last quarter of 1992, SGS-Thomson's global share of the EPROM [electrically programmable read-only memory] market (\$2.4 billion over the entire year) rose to 17 percent, putting the firm into second—maybe even first—place for that period.

[Caption to graphic; graphic not reproduced]

Not only with EPROMs is SGS-Thomson well-placed in global ranks. The firm also occupies choice spots with EEPROMs [electronically erasable programmable read-only memories] and special SRAMs [static random access memories] (cache tag, multiport, etc.). Remember, SGS-Thomson is also the number one global supplier of power circuits, mixed analog-digital circuits, telecommunications circuits, and dedicated circuits for automobiles. [Graphic not reproduced]

SGS-Thomson, IBM Cooperate in JESSI Silicon Wafer Project

93BR0426 Paris *ELECTRONIQUE INTERNATIONALE*
HEBDO in French 25 Feb 93 p 11

[Unattributed Article: "IBM and SGS-Thomson Cooperate in JESSI [Joint European Submicron Silicon Initiative] Project"]

[Text] The project is geared essentially toward the definition of production machinery needed to pass from 150-mm to 200-mm wafers.

SGS-Thomson and IBM started a project geared toward the production of integrated circuits using 200-mm-diameter silicon wafers within the scope of the

European JESSI [Joint European Submicron Silicon Initiative] microelectronics program.

The French-Italian group, which is also in charge of the project, confirms the project's existence, but for the moment refuses to provide details and to enumerate the amount of [EC] aid obtained for the project. We know, however, that the collaboration focuses essentially on production equipment. The upgrade to 200-mm diameter wafers (those currently used mostly have a diameter ranging from 125 to 150 mm) presents very specific problems. These are inherent to the wafer size, especially to obtain homogeneity during the processing and etching steps and, consequently, a homogeneous geometric pattern on the entire surface. According to Vincent Le Goasoz, technical coordinator at JESSI's Munich office, it appears that Japanese manufacturers have chosen to delay a move toward 200-mm wafers precisely because of these problems.

ES2 Semiconductor Firm Closes UK, German Plants

93BR0429 Paris ELECTRONIQUE INTERNATIONALE HEBDO in French 18 Mar 93 p 11

[Article by Françoise Grosvalet: "ES2 Concentrates Its Decisionmaking Structures in France"]

[Text] The European ES2 [European Silicon Structures] company, which specializes in the design and manufacture of application-specific circuits and which had its first profitable year in 1992, is now closing its German and British design centers to reduce costs.

After having achieved a \$1 million profit (including financial aid received through research contracts which were taken into account in the company's initial financing scheme) from a total sales figure of \$35 million in 1992 (up 18 percent compared with 1991), ES2 has decided to restructure its activities in order to remain profitable in 1993. This year's objective is to maintain the previously achieved net profit figures, (but this time without including any financial aid packages), while increasing revenues slightly. To this end, the European company has decided to concentrate all its decision-making authorities in Rousset, France, where its production facility is located. According to Christian Fleutelot, ES2 marketing director, this concentration in France does not imply a diversion from ES2's European strategy. Most of ES2's decisionmakers are French, except for President Werner Koepf, who is Austrian. The company's Luxembourg legal status remains and it has European shareholders among which Aerospatiale, Bull, Siemens, Philips, Olivetti, and British Aerospace.

Silicon Represents 80 Percent of Sales

The sole purpose of the company's decision to recentralize its activities is cost reduction and increased efficiency. The original company structure, with decentralized decisionmaking centers in the three main European countries (France, Germany, and the United

Kingdom) would be appropriate for a company with revenues exceeding \$100 million, but this, unfortunately, is not yet within ES2's range.

Part of the restructuring program has meant the closure of ES2's German (Munich) and British (Bracknell) design and development centers. However, each site will maintain a dedicated circuit design activity (for customers) manned by two engineers, whose equipment will be connected to the design center in Bievres in the southern suburbs of Paris. The remaining personnel have either been laid off (although only a minority, explains C. Fleutelot), or transferred to the British and German sales agencies which remain in place. All [cell] library developments which previously took place in Bracknell, Munich, and Bievres are now managed by the design center at Rousset.

Today, 80 percent of ES2's sales figure is derived from silicon sales (in the beginning, software and services made up the bulk of the sales). The company also has a quite significant foundry activity, but it is restricted to a number of large-account customers. The production unit at Rousset, which is now manufacturing submicron CMOS [complementary metal-oxide semiconductor] technology circuits, is not operating at full capacity. According to C. Fleutelot, however, "it was in the past, but productivity increases achieved over the last few years have enabled us to reduce and manage the utilization rate. This does not mean," he added, "that the unit might not reach full capacity by the end of the year."

SGS-Thomson's Recapitalization Finalized

93BR0441 Paris ELECTRONIQUE INTERNATIONALE HEBDO in French 18 Mar 93 p 13

[Article signed F.G.: "SGS-Thomson's Recapitalization Is Completed"]

[Text] The French and Italian shareholders [of SGS-Thomson] have decided to make an immediate advance payment of 1.4 billion French francs [Fr] to the semiconductor manufacturer.

SGS-Thomson's lengthy recapitalization saga, which began in November 1992, came to a conclusion on Thursday, 11 March, following approval for the proposed capital increase by the Italian shareholder (IRI [Industrial Reconstruction Institute]). Their approval was the last one needed: Brussels approved the operation at the end of February and the French shareholders (CEA [Atomic Energy Commission]-Industrie, France Telecom, and Thomson) gave their go-ahead at the end of last year. IRI, for its part, has supplied 400 million lire, equivalent to approximately Fr1.4 billion [figures as published; 100 lire = Fr0.343], a sum sufficient for the first part of the recapitalization. The two shareholders agreed to transfer \$1 billion (Fr5 billion at the time when the decision was made) to the French-Italian company; the first half to be paid immediately with the remaining amount payable within two years. CEA-Industrie has indicated that the French and Italian shareholders have

decided to proceed with the immediate advance of \$250 million (Fr1.4 billion) in order to effect the capital increase while awaiting the annual general meeting planned for 25 March.

The French government recently released the Fr2.55 billion that it had agreed to pay over a five-year period to support SGS-Thomson's R&D activities. The Italian partners should supply an equal amount. The French-Italian company, which made a small profit in 1992 (\$3 million out of a \$1.6-billion sales figure), is expected to supply an additional \$4.4 billion to cover its R&D expenditures over the same period.

With this increase in capital, SGS-Thomson will be able to implement its strategy, which has already been widely covered in our magazine.

Philips To Shed Its PC Manufacturing Activity

93BR0447 Amsterdam *COMPUTABLE* in Dutch
19 Mar 93 p 15

[Unattributed article: "Philips Stops Manufacturing Own PC's—Focus Shifted to Monitor Production"]

[Text] Eindhoven—Philips Nederland has stopped the manufacture of its own PCs. The Netherlands was one of the last countries where Philips was still manufacturing PCs. The price war in this sector has become too dirty for the ailing group.

"There are too many suppliers on the market, and the profit margins are too low. It simply no longer makes sense to manufacture PCs," explains Philips spokesman H. Waalwijk. Philips now obtains its computers from third parties, e.g., Dell Computers, which will henceforth deliver 486s. According to Waalwijk, the move is a purely strategic decision, which was taken "in consultation with the trade."

The former PC division will now concentrate on the production of monitors, a market in which Philips claims to have a steady position. The latest innovation on this market is the wide screen monitor, which boasts the same dimensions as HDTV [high-definition television] (16:9). With this monitor, Philips hopes to arouse great interest at the upcoming CeBit trade fair in Hannover.

Quietly

Only now has it become clear that the market for Philips PCs in the Netherlands is unprofitable. Production was halted quietly last year, soon after England and the Scandinavian countries had announced that they too would stop. At the time, it was maintained that the Dutch PC division was not taking any losses and that production would be started up again shortly. The PC division at Philips belongs to the loss-making Consumer Electronics division, which has for years been a millstone round the neck of the multinational. However, according to the management, there is no question of selling. For

the moment, Philips does not want to say whether or how PC sales played a role in the 553-million-guilder loss suffered by the Consumer Electronics division in 1992. This figure includes a loss of 193 million guilders by the company's Grundig subsidiary.

Annual Results

Philips incurred an overall loss of 900 million guilders. Sales rose by 3 percent in 1992, from 57 billion guilders in 1991 to 58.5 billion guilders last year. The operating result was 21 percent lower than in 1991: 2.49 billion guilders (excluding a reserve of 1.2 billion guilders for the upcoming restructuring). "We underestimated the depth of the recession in the consumer electronics sector," explained CEO Jan Timmer when announcing the annual results. The group then announced a new wave of streamlining measures, including the loss of between 10,000 and 15,000 of the company's 252,000 jobs.

The CEO emphasized that he had no plans to dispose of entire divisions, but that smaller branches would be shed if they failed to function satisfactorily. Timmer did not wish to specify which branches might be affected.

EAST-WEST RELATIONS

Franco-Russian Aerospace Cooperation

93P60191 Paris *LE FIGARO* in French 17 Mar 93 p 12

[Text] The French firm Aerospatiale announced yesterday that it has signed or prepared with different Russian institutes and industries a whole series of accords to develop jointly various short- and long-term projects, especially concerning the planes and space systems of the future.

The draft treaty between Louis Gallois, president of Aerospatiale, and Anatoliy Gennadiyevich Bratukhin, vice-president of the Committee of Russian Defense Industries, signed on 10 March, formalized the establishment of a Franco-Russian coordinating committee that is composed of four Russian and four French members. In the area of aeronautics, the first concrete theme covered by this agreement concerns the joint development of a civilian transport helicopter weighing 14 tons and equipped with Russian engines, that could fly within four years, according to Aerospatiale.

Concerning planes, the two countries envisage studying on the one hand the development of 100-seat aircraft that are smaller than those of the current Airbus fleet; at the same time, over the longer term, the partners foresee close collaboration on the development of two large projects at the beginning of the next century.

The first project is the "ATSF"—the Future Supersonic Transport Plane—which is to succeed the present Franco-British Concorde around the year 2005 with a speed equal to or slightly greater than Mach 2, but with double the range and transport capacity of the Concorde,

permitting the transport of more than 200 passengers for a distance of about 12,000 kilometers (km). At the same time, Aerospatiale could cooperate with the two well-known aviation companies Tupolev and Ilyushin in designing a "super-Jumbo"—a civilian transport plane with a capacity for 600 to 800 passengers.

Finally, in the area of aerospace, the French firm announced its intention to initiate discussions with the Russians over the question of manned flights, similar to actions already undertaken in this domain by the European Space Agency and France's National Space Studies Center.

West To Aid Eastern European Nuclear Waste Treatment

*93WS0312C Paris AFP SCIENCES in French
11 Feb 93 pp 27-28*

[Unattributed article: "Radioactive Waste: Cassiopee [Operational Assistance Consortium for East European Countries] to Help East Europe"]

[Text] Brussels—On 10 February, in Brussels, the radioactive waste management agencies of six EEC countries officially created the Cassiopee consortium to provide technical assistance to eastern European countries in setting up radioactive waste processing systems.

Cassiopee will pool the efforts of these six agencies' experts, who may be called into Eastern Europe, in particular to help with the creation of independent national waste-management agencies. European Community experts may also inventory waste dumps and evaluate sites and management systems, we learned from the same source.

Headquartered in Brussels, Cassiopee will answer directly Eastern Europe's requests, or requests from the European Commission in connection with the program of assistance to former communist countries. The Cassiopee European economic interest group consists of the National Radioactive Waste Management Agency (ANDRA, France), the Central Radioactive Waste Organization (COVRA, Netherlands), the German Company for the Construction and Operation of Nuclear-Waste End-Storage Sites (DBE), the National Radioactive Waste Company (ENRESA [Spain]), the National Organization for Radioactive Waste and Enriched Fissile Materials (ONDRAF, Belgium), and the United Kingdom Nirex.

Alcatel Bell Opens Training Center in Moscow

*93BR0454 Groot Bijgaarden DE STANDAARD
in Dutch 25 Mar 93 p 19*

[Unsigned article: "Alcatel Bell Provides Training in Moscow"]

[Text] Antwerp—The chancellor of the Moscow Technical University for Telecommunications (MTUCI),

Wagan Shakhgildyan, and the CEO of Alcatel Bell, John Goossens, officially opened the Mosbell training center in Moscow yesterday. Mosbell is a joint initiative by Alcatel Bell, its Russian joint venture LenBell, and the MTUCI.

The aim of Mosbell is to train engineers and technicians in various areas of digital telecommunications and to set up courses for training telecommunications managers. Mosbell required an investment of \$1.4 million (46 million Belgian francs [BFR]).

The CIS is becoming an increasingly important market for Alcatel Bell. Some BFR2 billion worth of orders are on the books so far. Together with LenBell, Alcatel Bell recently pulled in an order to deliver nine Alcatel-1000 S12 digital telephone exchanges to Khanty-Mansiysk Okrug, an autonomous region in southern Siberia.

According to a statement from Alcatel Bell, the joint ventures in the CIS are doing well.

Combella and World Trade Telecom in Moscow are doing especially well. There are already more than 1,300 hotels, enterprises, banks, and embassies connected to the Combella network for international voice and data transmission to and from Moscow. At Sovincenter, the largest trade center in Moscow, World Trade Telecom provides a range of telecommunications services.

EUROPE-ASIA RELATIONS

Swedish/Japanese Cooperation in Metal Hydride Batteries

*93WS0322B Stockholm NY TEKNIK in Swedish
18 Feb 93 p 4*

[Article by Sven-Olof Carlsson: "Japanese-Swedish Cooperation Will Produce Better Batteries"—first paragraph is NY TEKNIK introduction]

[Text] Japanese knowledge of alloys and Swedish knowledge of surface structure at the molecular level will lead to better chargeable batteries.

Swedish-Japanese research cooperation is on a high level. Dr. Tetsuo Sakai of the Japanese state research agency, Girio, is one of Japan's leading researchers in the area of metal hydrides, the key technology in the new chargeable batteries. He has been a visiting researcher at the Institution for Structural Chemistry at Stockholm University for several months.

The cooperation came about as a result of Japanese initiative. Japanese research occurs primarily in the area of industrial application. Therefore Girio wanted to become familiar with Swedish knowledge of molecular chemistry. Here Sweden has a long tradition, especially when it comes to less common metals (transition metals) that are one of the components of metal hydrides.

For Stockholm University the cooperation is a chance to establish a connection between Swedish basic research and current industrial research in an area with a real future.

Nickel-metal hydride batteries (Ni-MH) are now on the way on a broad front. They are an alternative to nickel-cadmium (Ni-Cd) batteries and already have a doubled energy storage capacity. This capacity could be increased significantly with the right alloys.

The batteries have been introduced in Europe recently. They have been sold in Japan for several years. Production of small Ni-MH batteries designed for consumer electronics is expected to reach 1 million in Japan this year.

According to Tetsuo Sakai the hardest problem associated with metal hydrides today is finding alloys that store a lot of energy but do not lose their charge too quickly. Suitable alloy metals include lanthanum, zirconium, vanadium, manganese and others.

EC, South Korea To Conclude DRAM Prices Agreement

93BR0425 Paris *ELECTRONIQUE INTERNATIONALE*
HEBDO in French 25 Feb 93 p 7

[Article by Didier Girault: "Consensus About the Minimum DRAM Prices"]

[Text] As the Korean-European DRAM [dynamic random access memory] agreement is about to be signed by Brussels, the European Electronic Component Manufacturers Association (EECA) shows its satisfaction. The Japanese, however, want to maintain their minimum prices.

An agreement on DRAM memories between South Korea and the EC should be signed 18 March. For each Korean manufacturer, it sets the DRAM sales price in Europe equal to the "production cost plus a 9.5-percent markup." For the EECA, this agreement, if signed, will be a good thing: "The Commission will be able to control whether or not there is dumping, because it will receive 'production cost' data each quarter." Although the association welcomes the price control agreement on imported Korean circuits, it deplores Brussels's slow response. "We sent a complaint about dumping practices in June 1990. It took almost three years to reach a conclusion...."

The EECA applauds that the authorized sales prices of Korean DRAMs will remain confidential. This is different than for the minimum price set for the Japanese, which, although officially confidential, is in effect known by purchasers the same day, and they use it as an argument in their negotiations with manufacturers, in particular to obtain better bids. "This is not what minimum prices are meant for," protests Eckhard Runge, EECA spokesman. "Respect for the confidentiality of prices imposed by Brussels on the Koreans,

however, also risks being problematic," according to Jacques Le Beguec, director of Mitsubishi's semiconductor department.

Shortage Slows Eventual Revision of Minimum Prices

Japanese manufacturers do not seem to want to change the system and move from a single minimum price, valid for all companies of the archipelago, to a "controlled" price, different for each of the players. "We thought that the Japanese were going to ask for treatment equal to that of the Koreans. The EC threw them a line. But it seems that the Japanese do not wish to abandon their minimum price agreement. This situation, even if its implementation is unsatisfactory, seems to reassure them," says Eckhard Runge. A consensus seems to have been reached on the minimum price. Thus, for the European manufacturer Siemens and the director of its semiconductor division, Juergen Knorr, the minimum price "is not ideal, but one can live with it." As for the Japanese, the minimum price system allows them not to directly divulge their production costs. These costs go through the Japanese Ministry of Trade and Industry, which gathers data from manufacturers and furnishes an overall figure to Brussels. For Japanese DRAM manufacturers with production facilities in Europe (Fujitsu, NEC, and Hitachi), the benefits of the minimum price system are even greater, since their DRAMs are not subjected to the 14-percent customs duties on semiconductor imports into Europe. This 14-percent tax could eventually be lowered to 9 percent [as a result of the EC-wide tax restructuring].

"In any case, everyone is now operating at maximum production capacity. In the short term, demand for memories is not expected to drop... and there will be no increase in production capacity for the first year to come," predicts Jacques Le Beguec.

UK, Japanese Researchers Develop Terabit Memory

93BR0443 Paris *ELECTRONIQUE INTERNATIONALE*
HEBDO in French 18 Mar 93 p 27

[Unattributed article: "Memories: First Steps Toward 1-Million-Megabit Memory Cell"]

[Text] By combining quantum transistors, electron-beam lithography, and a gallium arsenide substrate, British and Japanese researchers have shown the feasibility of a single-electron memory cell.

Researchers at Cambridge University and the Hitachi European research laboratory at Cambridge (UK) have developed jointly an experimental circuit which prefigures, in about 20 years, electronic memories that can hold 1 million times more information (1 terabit, or 1 million megabits) than today's typical memory cells. The 0.03-mm-wide circuit developed by the Japanese and British researchers stored a charge of about 100 electrons with minimum dimensions of approximately 1 micron.

According to the researchers, this proves that a single-electron memory cell is feasible if minimum dimensions are brought down to the nanometer scale. Such a cell could be produced experimentally before the end of the century. Furthermore, this level of circuit miniaturization is claimed to operate under acceptable temperatures: The experimental circuit operates at a temperature close to absolute zero.

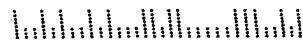
The memory cell developed by the British and Japanese researchers uses two grids of the Multiple-Tunneling Junction (MTJ) type to control the electron flow along a conductive path in order to create a capacitor for load storage as well as a detector for load sensing. MTJ grids work in a fashion similar to that of quantum devices. The circuit was created through electron-beam lithography on a silicon-doped gallium arsenide substrate.

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